

THE IRON AGE

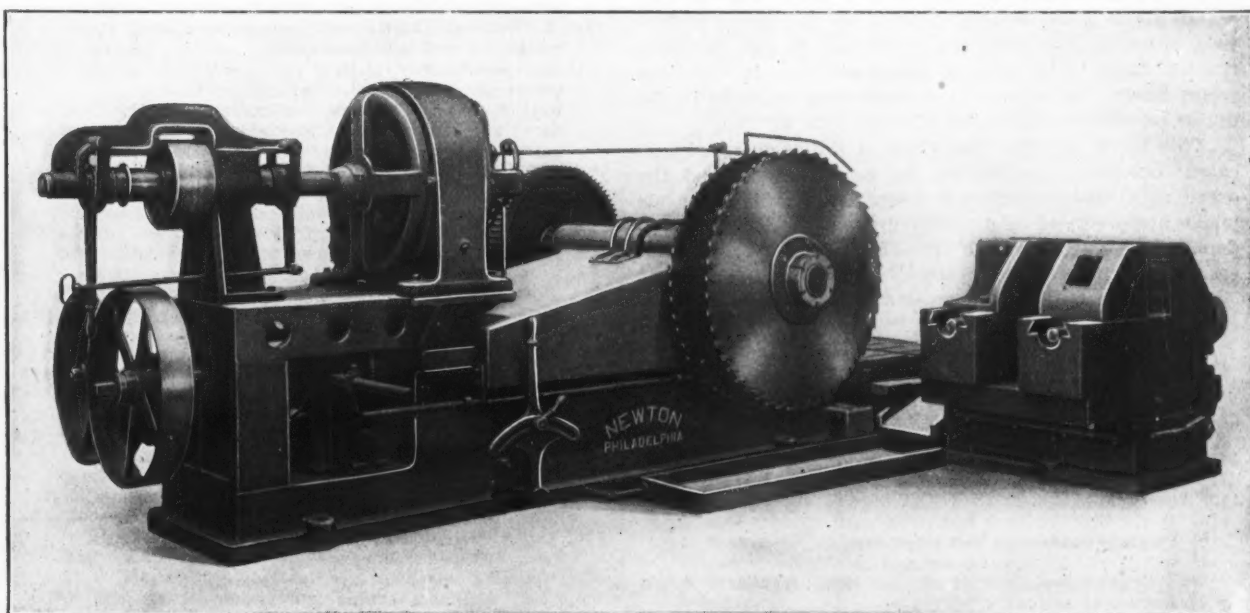
New York, Thursday, October 24, 1907.

A Special Newton Ingot Saw.

An interesting and new combination of features already familiar in the products of the Newton Machine Tool Works, Philadelphia, is to be found in the heavy motor driven cold saw herewith illustrated. This machine was designed and built for the American Locomotive Company, and is particularly adapted for such heavy work as that of cutting off steel axle ingots 13 in. square, for the holding of which it was necessary to design the special vises shown in the engraving. The maximum capacity of the tool is the cutting off of round stock up to 15 in. in diameter, and square stock up to 13½ in. The special vises referred to are removable, so that the machine may be used for cutting open end connecting rods, rod straps and guide yokes, as well as for other miscellaneous purposes. Two Disston Premier inserted tooth saw

Adjustable trips discontinue the feed when the required distance has been traversed. By means of the clutch at the extreme left on the extended motor shaft, operated by the vertical lever beneath it, the saw arbor may be stopped without stopping the saddle driving mechanism, which allows the saw blades to remain idle while they are being withdrawn from the cut, or in case a tooth breaks the clutch can be thrown out instantly stopping the saws, so as to save the other teeth in the blade. The other clutch, nearer the motor and operated by the lever connected to the horizontal handle, commands all movements of the machine, and when it is disengaged the motor may continue to run without doing any work. The advantage of this is the saving of time that would be lost by stopping and starting electrically. The motor being always up to normal speed, any part may be instantly put in action at full speed.

Belts connect the motor shaft with the pulleys at the left and introduce a protection to the mechanism by slip-



A Motor Driven Ingot Saw for Heavy Duty, Built by the Newton Machine Tool Works, Philadelphia, Pa.

blades, 48 in. in diameter, are provided, which are used singly for cutting off work or simultaneously, for slotting. The blades are adjustable on the extension of the spindle up to a maximum distance of 10 in. between the outside edges of the blades.

The general design of the tool is along lines of previous Newton productions. All parts, however, are made extra heavy to withstand the extreme duty to which it will be subjected. The spindle is 8 in. in diameter, and is driven through compound spur gearing and a phosphor bronze worm wheel and hardened steel worm, which are encased and run in oil. The total ratio of the gearing is 114 2-7 to 1, which gives some idea of the enormous cutting power possible. The saddle has an automatic feed of 32 in., and enables cutting to a depth of 30 in. in an oblong section 11 in. high. The work is held on the front table, which has an area of 36 x 40 in., by means of the usual clamps or by the special vises which are held in position by bolts fitting in the T slots in the table and the base of the vises. The vises are of steel and have an extreme opening of 15½ in., the jaws being operated by steel screws.

A 25-hp. two to one variable speed motor mounted on what may be compared to the headstock of the machine, provides the drive to the saw arbor and the quick traverse and automatic feeding movements to the saddle. The feed is variable in amount, through change gears which are interlocking in their combinations, so that the most efficient rate of feed per minute can be obtained.

ping in case of overload or accidental interference with any movement. The pulley at the rear, through the gearing before mentioned, drives the saw blade arbor, and the one at the front the feeding and quick traversing of the saddle. This pulley runs continuously, and the stopping and starting of the feed or the quick traverse is accomplished through clutches. The quick traverse returns the saddle after a cut is completed and adjusts it to approximate starting position before engaging the automatic feed. It is controlled by the vertical lever at the rear side of the machine. Its extreme positions correspond to the opposite directions of movement, and its mid-position is the neutral one occupied when the quick traverse is disengaged. A clamping handle prevents an accidental starting of the quick traverse mechanism while the regular feed is in action. The horizontal lever at the left projecting from within the frame, manipulates the feeds. It may be operated by hand at will to start or stop the feed to the saddle, or may be automatically operated at predetermined positions of the saddle, by the rod connected with it and carrying adjustable collars through which the rod is shifted when contact is made with a strap attached to the carriage.

The machine occupies a floor space of 14 x 6 ft., and weighs complete 35,000 lb. An oil pump is provided to deliver lubricant to the saw blades while cutting. A pan beneath the blades catches the lubricant and chips and the liquid is drawn from the pan by the suction of the pump and again delivered to the saws.

The New Australian Tariff.

Herewith we present such extracts from the new Australian tariff, now in effect, as relate to iron and steel products and kindred articles. This presentation is exceedingly interesting, as it demonstrates the thoroughness with which another British dependency has gone into the arrangement of duties for the purpose of laying a foundation for the establishment of more numerous domestic industries. It is altogether likely that the Australian tariff enters as minutely into the specific enumeration of manufactured articles as the tariff of any other country, if indeed the enumeration is not more exhaustive. It does not seem to have followed the lines of tariffs of other countries, but those who framed it have proceeded on original lines.

In looking over these schedules the reader will probably be of the opinion that an unnecessary duplication has been made in the repetition in Divisions VIa and Vlb of many of the paragraphs in Division VI, as the paragraphs are numbered the same. Careful scrutiny, however, will show that this repetition is necessary, as the duties enumerated in Division VI, which are lower than in the other two divisions, will only continue until manufactures in the lines affected are sufficiently established in the commonwealth of Australia to make manufacturers in those lines become entitled to additional protection, in which case advanced duties will be put in operation on dates to be fixed by proclamation. It therefore seems likely that important changes may be made in the duties scheduled in Division VI from time to time.

This tariff provides two rates of duties in nearly all cases; one rate constituting the general tariff and the other rate, which is always lower, the tariff for goods which are produced or manufactured in the United Kingdom. Thus Australia, like Canada, proposes to give preference to British manufacturers.

Para-graph.	Tariff Items.	Tariff for goods the produce or manufacture of the United Kingdom.	Tariff for goods the produce or manufacture of the United Kingdom.
<i>Division VI.—Metals and Machinery.</i>			
141.	Ammunition—viz., shot, bullets and slugs, per cwt.....	5/6	5/
142.	Arms—viz.:		
(a)	Double-barreled guns and rifles, each.....	11/	10/
(b)	Single-barreled guns and rifles, each.....	5/6	5/
(c)	Revolvers, pistols, saloon and pea rifles, and air guns and pistols, each.....	2/9	2/6
(d)	Barrels or actions, other:		
(1)	For double-barreled guns, each.....	5/6	5/
(2)	For single-barreled guns, each.....	2/9	2/6
(e)	Bayonets, swords, fencing foils, and masks; gun, revolver and pistol covers, cases and fittings; loading tools and cartridge belts, ad valorem.....	22½ %	15 %
(f)	N.e.l., ad valorem.....	22½ %	15 %
(g)	Rifles, military and match, including authorized cadet rifles and Morris tubes; gun stocks in the rough; barrels (not fitted to any action) bearing the British test mark.....	5 %	Free.
143.	Iron, plate and sheet—viz.:		
(a)	Corrugated galvanized, ad valorem.....	25 %	20 %
(b)	Galvanized not corrugated, and corrugated not galvanized, ad valorem.....	20 %	15 %
144.	Lamps and lampware—viz.:		
(a)	Oil and other self-contained lamps, lanterns and parts thereof, including one chimney, shade and globe, or other article imported with and used as an integral part of any lamp or lantern; coach and carriage lamps and lamp irons; arc lamps and accessories; and incandescent lamps and bulbs, ad valorem.....	25 %	15 %
(b)	Fittings for lighting purposes, including parts thereof (except chimneys, glass shades and globes); lamps and lampware, n.e.l. (but not the columns of street lamps); metal reflectors and shades, ad valorem.....	25 %	15 %
(c)	Lamp, gas and electrical stoves, for heating and cooking, ad valorem.....	30 %	20 %
(d)	Incandescent mantles, ad valorem.....	40 %	30 %
145.	Lamps, miners' safety.....	10 %	Free.
146.	Lead, sheet and piping, per ton.....	50/	
147.	Mangles, clothes wringers and washing machines, n.e.l., ad valorem.....	20 %	
148.	Agricultural, horticultural and viticultural machinery and implements, n.e.l.; including cane loaders on wheels; channel making graders; feed grinders; garden and field spraying machines; garden and field rollers;		
	garden hose reels; garden syringes; horse road rollers and machines; lawn mowers; sweepers and sprinklers; road making plows; road scoops and scrapers; scoops; stump extractors, ad valorem.....	20 %	
149.	Chaff cutters and horse gears; chaff cutter knives; corn shellers; corn huskers; cultivators, other than disk; harrows; plows, other; plow shares; plow mold boards; scarifiers, ad valorem.....	20 %	
150.	Combined corn sheller, husker and bagger; combined corn sheller and husker; disks for agricultural implements; disk cultivators; drills (fertilizer, seed and grain), and all attachments thereto; stump-jump plows; winnowers (horse and other power); seats, poles, swingle bars, yokes and trees for agricultural machines, when imported separately, ad valorem.....	25 %	
151.	Churns of all kinds; cheese presses; dairy coolers; dairy refrigerators; supply cans; incubators, n.e.l.; foster mothers, ad valorem.....	25 %	
152.	Stripper harvesters, each.....	£16	
153.	Strippers, each.....	£8	
154.	Metal parts of stripper harvesters and strippers, per pound.....	2½d.	
155.	Agricultural, horticultural and viticultural machinery and implements—viz.:		
	Cream separators; testers and pasteurizers; cotton gins; fiber scutching machines; hand-worked rakes and plows combined; hay tedders; horse rakes; Lucerne bunchers; maize harvesters; maize binders; milking machines; moldboard plates, in the rough and not cut into shape; potato raisers or diggers; potato sorters; root cutters, pulpers and graters; sheep shearing machines; straw stackers; sub-surface packers; threshing machines; winnowing forks (wood and steel).....	10 %	Free.
156.	Cutlery of all kinds, n.e.l.; including plated cutlery, clippers, knife sharpeners, manicure sets, but not cutlery in part or wholly made up of gold or silver, ad valorem.....	20 %	15 %
157.	Crucibles.....	Free.	
158.	Diving apparatus, not including hose.....	Free.	
159.	Nails—viz.:		
(a)	Horseshoe nails, per cwt.....	8/3	7/6
(b)	Brads (including molders' and glaziers'); picture nails; rail dogs or brobs; spikes; staples, n.e.l.; tacks, n.e.l.; wire and other nails, n.e.l., per cwt.....	5/6	5/
160.	Tanks containing goods, or empty.—For every 100 gal. capacity or part thereof.....	3/	
161.	Weighing machines; weighbridges; scales, n.e.l.; including adding and computing machines, and all attachments; cash registers; chemists' counter scales; spring balances and steel-yards; weights n.e.l., ad valorem.....	20 %	
162.	Marine engines, boilers and machinery; and fittings and mountings, n.e.l., for such engines, boilers and machinery; shafts; propellers; winches; liners for cylinders; windlasses; steering gear; feed water heaters; feed pumps; evaporators; auxiliary condensers; feed water fillers; and ash ejectors, ad valorem.....	25 %	
163.	Steam road rollers, including scarifier attachments, ad valorem.....	25 %	
164.	(a) Engines (including traction and portable), n.e.l.; turbines; winches, n.e.l.; boilers, n.e.l.; pumps; windmills, ad valorem.....	30 %	25 %
(b)	Elevating and conveying machinery; pile driving plant; economizers; cranes; beer engines; cloth folding and measuring machines; wool and other presses; lifts; water and gas meters, ad valorem.....	30 %	25 %
(c)	Machines and machinery, n.e.l., ad valorem.....	30 %	25 %
165.	Machinery and parts thereof—viz.:		
	Steam engine indicators and recorders; patent porcelain and steel boilers for flour mills; roll shells; typewriters (including covers); zinc refining retorts; fire engines; stitching machines; sewing machines (including cabinets and covers); button-hole punching and sewing machines; darning machines; straw envelope making machines.....	10 %	Free.
166.	Machinery and machines; and machine tools, n.e.l.—viz.:		
(a)	Machines, n.e.l., used in the tanning of hides and skins, and in the preparation of leather; automatic can making and closing machines; machinery for scouring and washing wool; machinery for the manufacture of paper, and for felting; soap cutting machines; artesian boring machines, ad valorem.....	25 %	20 %

Tariff
for goods
the produce
or manufac-
ture of the
General United
tariff. Kingdom.

Para- graph.	Tariff Items.	Tariff for goods the produce or manufac- ture of the General United tariff. Kingdom.	
(b)	Machine tools:		
	Hat making—Hydraulic blocking press for mak- ing straw hats, ad valorem.....	25 %	20 %
	Indiarubber working—Hose machines, steel stamps, steel tire mandrills, spreading, tread drums, washer cutting, ad valorem.....	25 %	20 %
	Metal working—Wire cutting machines, blow- ers for foundry and mining purposes; pneu- matic hammers; steam hammers, up to and including sizes up to 16-in. cylinders; punching and shearing machines, combined or separate, sizes up to ¾-in.; slotting ma- chines, sizes up to 12-in. stroke; centering machines, to center up to 6-in. diameter; bolt screwing and nut tapping, combined or separate, sizes above ¾ in., and up to 2 in.; bending rolls, in sizes to bend up to ¾-in. plate, ad valorem.....	25 %	20 %
	Artisan boring tools, n.e.l., ad valorem.....	25 %	20 %
	Boot making machine tools, n.e.l., ad valorem.....	25 %	20 %
	Tire benders and shrinkers, ad valorem.....	25 %	20 %
	Tinsmiths' tools, being machine, ad valorem.....	25 %	20 %
167.	Machine tools, as prescribed by departmental by-laws	Free.	
168.	Any dutiable machinery, or machine tool, or any part thereof specified in any proclamation issued by the Governor-General in pursuance of a joint address passed on the motion of Ministers by both houses of the Parliament, stating that such machinery, machine tool, or part cannot be reasonably manufactured with- in the commonwealth, and that it should be admitted free.....	Free.	
169.	Tools of trade, for the use of artisans and mechanics, and tools in general use, as pre- scribed by departmental by-laws.....	Free.	
170.	Mixed metal ware and plated ware, n.e.l., ad valorem.....	30 %	25 %
171.	Manufactures of metal, n.e.l., ad valorem.....	30 %	25 %
172.	Saws, n.e.l., ad valorem.....	25 %	20 %
173.	Brass work and gun metal work, for general engineering and plumbing, and other trades, ad valorem.....	30 %	25 %
174.	Type, printers', ad valorem.....	25 %	20 %
175.	Fire extinguishers, hand, ad valorem.....	20 %	
176.	Screws, n.e.l.; including screws with nuts not being bolts and nuts; sash screws and attachments; engineers' set screws; music stool and table; roofing, and spiral screws... 5 %	Free.	
177.	Mining engines and machinery, n.e.l., ad val.....	35 %	25 %
178.	Electrical machinery—viz.:		
	(a) Generators; motors up to the capacity of 500 hp.; fans, starting and regulating rheo- stats, ad valorem.....	30 %	25 %
	(b) N.e.l., ad valorem.....	17½ %	12½ %
179.	Electrical and gas appliances—viz.:		
	(a) Electrolers; gasaliers; chandellers; pen- dants; brackets, switches; controlling devices, n.e.l.; radiators; and zinc tubing, ad valorem.....	25 %	20 %
	(b) N.e.l., ad valorem.....	17½ %	12½ %
180.	Electrical materials—viz.:		
	Accumulators or storage batteries, including glass cells used therewith; cable and wire (covered); carbons; testing meters and in- struments; translators; insulating tapes; meters; resistance coils; static transformers and terminals; photometers for gas and elec- tricity	5 %	Free.
181.	Rails, fish plates, fish bolts, tie plates and rods, switches, points, crossings and inter- sections, for railroads and tramways, ad val.....	12½ %	25 %
182.	Iron pipes, cast, and wrought, n.e.l., ad val.....	30 %	
183.	Iron and steel tubes or pipes (except riveted or cast) not more than 4 in. internal diame- ter; including flexible metal tubes; Galloway and vertical parallel boiler tubes; water bore castings; wrought iron fittings for pipes.....	Free.	
184.	Rolled iron or steel beams, channels, joists, girders, columns, trough and bridge iron and steel, not drilled or further manufactured; shafting, cold rolled, turned or planished, ad valorem.....	17½ %	12½ %
185.	Bolts, nuts, rivets and washers, n.e.l., ad val.....	30 %	25 %
186.	Barbed wire, ad valorem.....	30 %	20 %
187.	Wire netting, ad valorem.....	30 %	25 %
188.	Electrotypes and stereotypes for advertising purposes:		
	For block of 12 sq. in. and under.....	1/	
	For every square inch over 12 sq. in.....	1d.	
189.	Ammonia condenser coils, and coils for sugar boilers and the like; corrugated cylinders for boilers, ad valorem.....	25 %	
190.	Plates (except plain tin) and sheets and pipes and tubes of any metal, tinned, plated, polished or decorated, ad valorem.....	15 %	

Para- graph.	Tariff Items.	Tariff for goods the produce or manufac- ture of the General United tariff. Kingdom.	
191.	Aluminum, bronze, yellow metal, Britannia metal, nickel, and German silver—viz.: Pigs, ingots, scrap, blocks, bars, strips, sheets (plain), plates (plain), pipes (plain), and tubes (plain).....	Free.	
192.	Anchor, over 10 cwt.....	5 %	Free.
193.	Anodes and hooks for plating purposes.....	5 %	Free.
194.	Bolts, carriage (¾ in. and under in diameter and 4 in. and under in length).....	5 %	Free.
195.	Brass—viz.: Scrap, bars, sheets (plain), pipes (plain), tubes (plain), and strips.....	Free.	
196.	Capsules, metallic.....	5 %	Free.
197.	Chain, n.e.l., not made into serviceable ar- ticles	5 %	Free.
198.	Copper—viz.: Strips, scrap, bars, rod, wire, sheets (plain), pipes (plain), and tubes (plain)	Free.	
199.	Cylinders for anhydrous ammonia and for gas	5 %	Free.
200.	Droppers, patent steel of all lengths.....	5 %	Free.
201.	Eyelets and eyelet studs.....	5 %	Free.
202.	Fasteners, machine belt.....	5 %	Free.
203.	Thimbles and block fasteners for lasts.....	5 %	Free.
204.	Leaf and foil of any metal.....	5 %	Free.
205.	Locks; including knobs, keys, escutcheons and staples	5 %	Free.
206.	Pins (not being gold or silver or gold or silver plated),—viz.: Gimp; solid headed short toilet; plain wire hair; plain safety; and crochet hooks.....	5 %	Free.
207.	Platinum—viz.: Bars, strips, tubing, pipes, sheets, and plates.....	Free.	
208.	Retorts, pans, condensers, cylinders, and other articles used in the manufacture of acids and in laboratories and made of platinum.....	5 %	Free.
209.	Printers' materials—viz.: Circles, clumps, curves, knives (paring), rules, leads, and slugs	5 %	Free.
210.	Rabbit traps, dog traps, vermin traps.....	5 %	Free.
211.	Saddlers' and harness makers' materials— viz.: Saddlers' tacks (not cut) and nails, snaps (harness and halter), spurs (not being partly or wholly of gold or silver, or plated), and spur boxes.....	5 %	Free.
212.	Scales—viz.: Chemical, analytical, and assay, including weights; and precision and physical balances	Free.	
213.	Scrap iron and steel, and, subject to Depart- mental by-laws, materials for use as scrap iron	Free.	
214.	Screw hooks, eyes, and rings.....	5 %	Free.
215.	Sprinklers (not being partly or wholly of gold or silver) for perfume bottles.....	5 %	Free.
216.	Standards, steel fencing of all lengths and pillars	5 %	Free.
217.	Steel, band or ribbon, for making band saws or band knives.....	5 %	Free.
218.	Steel grit and steel wool, and steel balls for other than cycle bearings.....	5 %	Free.
219.	Steel knives, for hand tobacco cutters and hand tin openers.....	5 %	Free.
220.	Steel, rough shaped, for chaff cutter and other knives	5 %	Free.
221.	Tin plates, plain.....	5 %	Free.
222.	Tubes (collapsible) empty.....	5 %	Free.
223.	Washers and rivets, copper.....	5 %	Free.
224.	Wedge, patent, for droppers and standards.....	5 %	Free.
225.	Wire cloth, wire gauze.....	5 %	Free.
226.	Wire, n.e.l.....	10 %	Free.
227.	Zinc—viz.: Bar, scrap, sheet (plain), and circles and ingots bored or unbored for cyanide gold process, and zinc sheets (perforated with round holes or less than ¼ in. in diameter), for meat safes and covers.....	Free.	
228.	Zinc blocks for marine boilers.....	5 %	Free.

Division VII.

To come into operation on dates to be fixed by proclama-
tion, and exempt from duty in the meantime. Proclamation
to issue as soon as it is certified to Parliament by the Minister
that the manufacture to which the proclamation refers has been
sufficiently established in the commonwealth.

229. Iron and steel:

- (a) Scrap iron and steel, and pig iron, ad
valorem
- (b) Ingots; blooms; slabs; billets; puddled bars
and loops; or like crude manufactures, less
finished than iron or steel bars, but more ad-
vanced than pig iron (except castings), ad
valorem
- (c) Bar; rod; angle; tee; sheet and plate
(plain); wire and hoop, ad valorem.....
- (d) Machinery, machines and parts—mowers;
reapers; and reapers and binders, ad valorem.....

Para- graph.	Tariff Items.	Tariff for goods the produce or manufac- ture of the General United tariff. Kingdom.
(e)	Iron and steel tubes and pipes, not ductile under Division VI, ad valorem.....	12½ %
(f)	Spelter, ad valorem.....	10 %

Division VII.

To come into operation on dates to be fixed by proclamation, and subject to the duties specified in Division V in the meantime. Proclamation to issue so soon as the duties specified in Division VII have been brought into operation.

143.	Iron, plate and sheet—viz.:		
(a)	Corrugated galvanized, ad valorem.....	30 %	25 %
(b)	Galvanized not corrugated, and corrugated not galvanized, ad valorem.....	25 %	20 %
147.	Mangles, clothes wringers, and washing machines, n.e.l., ad valorem.....	22½ %	
148.	Agricultural, horticultural, and viticultural machinery and implements, n.e.l.; including cane loaders on wheels; channel making graders; feed grinders; garden and field spraying machines; garden and field rollers; garden hose reels; garden syringes; horse road rollers and machines; lawn mowers, sweepers, and sprinklers; road making plows; road scoops and scrapers; scoops; stump extractors, ad valorem.....	22½ %	
149.	Chaff cutters and horse gears; chaff cutter knives; corn shellers; corn huskers; cultivators other than disk; harrows; plows other; Plow shares; plow mold boards; scarifiers, ad valorem.....	22½ %	
150.	Combined corn sheller, husker and bagger; combined corn sheller and husker; disks for agricultural implements; disk cultivators; drills (fertilizer seed and grain), and all attachments thereto; stump jump plows; winnowers (horse and other power); seats, poles, swing bars, yokes, and trees for agricultural machines, when imported separately, ad valorem.....	27½ %	
151.	Churns of all kinds; cheese presses; dairy coolers, dairy refrigerators; supply cans; incubators, n.e.l.; foster mothers, ad valorem.....	27½ %	
152.	Stripper harvesters, each.....	£16/10/	
153.	Strippers, each.....	£8/5/	
154.	Metal parts of stripper harvesters and strippers, per pound.....	2½d.	
159.	Nails—viz.:		
(a)	Horseshoe nails, per hundredweight.....	8/0	8/
(b)	Brads (including molders' and glaziers'); picture nails; rail dogs or brobs; spikes; staples, n.e.l.; tacks, n.e.l.; wire and other nails, n.e.l., per hundredweight.....	5/6	5/3
160.	Tanks containing goods or empty.—For every 100 gal. capacity or part thereof.....	3/3	
161.	Weighing machines; weigh bridges; scales, n.e.l.; including adding and computing machines, and all attachments; cash registers; chemists' counter scales; spring balances and steel yards; weights, n.e.l.; ad valorem.....	25 %	
162.	Marine engines, boilers, and machinery, and fittings, n.e.l., and mountings, n.e.l., for such engines, boilers, and machinery; shafts; propellers; winches; liners for cylinders; windlasses; steering gear; feed water heaters; feed pumps; evaporators; auxiliary condensers; feed water fillers, and ash ejectors, ad valorem.....	27½ %	
163.	Steam road rollers, including scarifier attachments, ad valorem.....	27½ %	
164.	(a) Engines (including traction and portable), n.e.l.; turbines; winches, n.e.l.; boilers, n.e.l.; pumps; windmills, ad valorem.....	32½ %	27½ %
(b)	Elevating and conveying machinery; pile driving plant; economizers; cranes; beer engines; cloth folding and measuring machines; wool and other presses; lifts; water and gas meters, ad valorem.....	32½ %	27½ %
(c)	Machines and machinery, n.e.l., ad valorem.....	32½ %	27½ %
166.	Machinery and machines; and machine tools, n.e.l.—viz.:		
(a)	Machines, n.e.l., used in the tanning of hides and skins, and in the preparation of leather; automatic can making and closing machines; machinery for scouring and washing wool; machinery for the manufacture of paper, and for felting; soap cutting machines; artesian boring machines, ad valorem.....	27½ %	22½ %
(b)	Machine tools:		
Hat making—Hydraulic blocking press for making straw hats, ad valorem.....	27½ %	22½ %	
India rubber working—Hose machines; steel stamps; steel tire mandrills; spreading; tread drums; washer cutting, ad valorem.....	27½ %	22½ %	
Metal working—Wire netting machines; blowers for foundry and mining purposes; pneumatic			

Para- graph.	Tariff Items.	Tariff for goods the produce or manufac- ture of the General United tariff. Kingdom.
	hammers; steam hammers, up to and including sizes up to 16-in. cylinders; punching and shearing machines, combined or separate, sizes up to ¾-in.; slotting machines, sizes up to 12-in. stroke; centering machines, to center up to 6 in. diameter; bolt screwing and nut tapping, combined or separate, sizes above ¾-in. and up to 2-in.; bending rolls in sizes to bend up to ¾-in. plate, ad valorem.....	27½ % 22½ %
	Artesian boring tools, n.e.l., ad valorem.....	27½ % 22½ %
	Boot making machine tools, n.e.l., ad valorem.....	27½ % 22½ %
	Tire benders and shrinkers, ad valorem.....	27½ % 22½ %
	Tinsmiths' tools, being machine, ad valorem.....	27½ % 22½ %
171.	Manufacture of metal, n.e.l., ad valorem.....	32½ % 27½ %
172.	Saws, n.e.l., ad valorem.....	27½ % 22½ %
177.	Mining engines and machinery, n.e.l., ad valorem.....	37½ % 27½ %
181.	Rails, fish plates, fish bolts, tie plates and rods, switches, points, crossings and intersections, for railroads and tramways, ad valorem.....	22½ % 17½ %
182.	Iron pipes, cast and wrought, n.e.l., ad valorem.....	32½ % 27½ %
184.	Rolled iron or steel beams, channels, joists, girders, columns, trough and bridge iron and steel, not drilled or further manufactured; shafting, cold rolled, turned or planished, ad valorem.....	22½ % 17½ %
185.	Bolts, nuts, rivets and washers, n.e.l., ad valorem.....	32½ % 27½ %
190.	Plates (except plain tin) and sheets and pipes and tubes of any metal, tinned, plated, polished or decorated, ad valorem.....	20 %

Division XIV.—Vehicles.

369.	Bicycles, tricycles and similar vehicles, n.e.l., and frames thereof, whether partly or wholly finished, each.....	£5/5/	£5
	or ad valorem.....	30 %	25 %
	Whichever rate returns the higher duty.		
370.	Children's cycles, ad valorem.....	25 %	20 %
371.	Motor cycles, tricycles and similar vehicles, n.e.l., and frames thereof, whether partly or wholly finished, each.....	£10/10/	£10
	or ad valorem.....	30 %	25 %
	Whichever rate returns the higher duty.		
372.	Cycle tubing and fork sides in the rough; liners, including bent tubing not brazed or plates.....	5 %	Free.
373.	Perambulators and go-carts, and parts thereof, n.e.l., ad valorem.....	35 %	30 %
374.	Perambulators or go-cart body and under-gear, each.....	5/3	5/
375.	Cycle parts, plated, brazed, enameled or permanently joined (including chains); cycle accessories and parts thereof, including cyclometers, steel trouser clips, steel toe clips and bands, parcel carriers, inflators, inflator clips and connections, bells, saddle covers, tool bags, repair outfits and the like, ad valorem.....	25 %	20 %
376.	Cycle parts, n.e.l.; including steel bars for the manufacture of rims; also unplated parts, namely, ball heads, bottom brackets, lugs, fork ends, bridges, sprocket wheels, balls, nipples, spokes, washers, n.e.l., and valves for tires, ad valorem.....	15 %	10 %
377.	Vehicles—viz.:		
(a)	Boston chaises, dog carts, gigs, tilburys and other two-wheeled vehicles on springs or thorough braces, each.....	£6/12/	£6
(b)	Buggies, four-wheeled; wagons, for carrying goods; wagons, single or double seated; wagons, express, without tops, mounted on springs or thorough braces, each.....	£9/18/	£9
(c)	Hansom cabs; single and double seated wagons; wagonettes; four-wheeled buggies, with tops, each.....	£13/4/	£12
(d)	Omnibuses and coaches for carrying mails or passengers, each.....	£27/10/	£25
(e)	Barouches; Broughams, drags; landaus; mail phaetons; Victorias, each.....	£44	£40
(f)	All carts and wagons (without springs) and spring carts and spring drays, with two wheels, ad valorem.....	30 %	20 %
(g)	All carriages or conveyances, n.e.l.; hand trucks and parts, n.e.l., of vehicles, including axles and springs when imported separately, ad valorem.....	35 %	25 %
(h)	Parts of carriages—		
(a)	Sets of wheels (unbored and untired), per set.....	33/	30/
(b)	Sets of wheels (bored and tired), per set.....	49/6	45/
(c)	Under gear (including axles, springs and arms), per set.....	66/	60/
(d)	Buggy hoods, each.....	49/6	45/
(e)	Carriage bodies, in the white, each.....	88/	80/

Para- graph.	Tariff Items.	Tariff for goods the produce or manufac- ture of the General United tariff. Kingdom.	
(1)	Motor lorries and wagons, ad valorem.....	35 %	25 %
(j)	Motor cars and parts thereof, including tires when accompanying vehicles, ad valorem.....	35 %	25 %
<i>Division XVI.—Miscellaneous.</i>			
391.	Carpet sweepers, brooms, whisks, mops, ad valorem	30 %	25 %
392.	Coke, per ton.....	4/	
395.	Rope cordage, and twines, n.e.l.; including cordage with metal core; macrame twines; fleece thread; brush makers' and mattress twine; saddlers' twines; roping, seaming, sew- ing and shop twines; and coir fenders, halters and other articles manufactured from cord or twine, ad valorem.....	25 %	
398.	Reaper and binder twine and yarn, per cwt..	5/	
401.	Metal cordage, including cordage of metal, with core of other material.....	Free.	
402.	Copying apparatus for duplicating typewrit- ing, and the like, ad valorem.....	25 %	
406.	Explosives—viz.:		
(a)	Cartridges, n.e.l., ad valorem.....	30 %	20 %
(b)	Fireworks, ad valorem.....	35 %	25 %
(c)	Fuse, n.e.l., per coll of 24 ft. or less, and in proportion for any greater quantity, per coll	1 1/4 d.	1 d.
(d)	Powder, sporting, per pound.....	4 1/2 d.	4 d.
(e)	Wads for cartridges, ad valorem.....	25 %	20 %
(f)	Caps, percussion.....	5 %	Free.
(g)	Cartridges, military.....	5 %	Free.
(h)	Detonators	5 %	Free.
(i)	Cartridge cases, empty, capped, or un- capped	5 %	Free.
(j)	Fuse cotton.....	5 %	Free.
(k)	Fuses, electrical.....	5 %	Free.
(l)	N.e.l.	5 %	Free.
442.	Scientific instruments and apparatus.....	Free.	
444.	Outside packages, n.e.l., in which goods other than those subject to an ad valorem duty are ordinarily imported, when containing such goods	Free.	

General regulations provide that all imitations are to be dutiable at the rate chargeable on the goods they imitate, unless such rate is less than the rate which would otherwise be chargeable on the imitations. The term iron includes steel. Sheet, when applied to metals, means a sheet or plate not exceeding 3-16 in. in thickness; when applied to glass, means a sheet or plate not exceeding 1/8 in. in thickness. Plate, when applied to metals, means a plate or sheet more than 3-16 in. in thickness; when applied to glass, means a plate or sheet more than 1/8 in. in thickness. "N.e.l." means "not elsewhere included." "Departmental by-law" means by-law made by the Minister, and published in the *Gazette*.

Any article, not otherwise dutiable, composed of a combination of other articles, some of which are dutiable when imported separately, and of others free of duty when imported separately, shall be dealt with as follows:

- When the value of the dutiable portion exceeds the value of the free portion, duty shall be charged upon the whole article at the same rate as would be chargeable on that portion of the dutiable portion which, if imported separately, would be liable to the highest rate of duty.
- When the value of the free portion exceeds the value of the dutiable portion of such article, the whole article shall be admitted free of duty.

Motive power, engine combinations and power connections are dutiable under their respective headings, when not integral parts of exempted machines, machinery or machine tools.

The Colburn Machine Tool Company's Condition.—The Colburn Machine Tool Company, Franklin, Pa., which has been enduring a machinists' strike for the past five months, handled by the National Metal Trades Association, advises us that has secured enough men to operate the machine departments practically full, while the erecting department is also running to about normal capacity. The company manufactures a line of boring mills and other machinery, and states that its deliveries are now much better and that it expects to be in full operation again within a very short time. Some recent orders secured for boring mills and other machinery include equip-

ment to go to the Isthmus of Panama and other Government contracts, while some nice export business has been taken for Germany and Italy, one shipment last month going to Japan. The company has installed some additional power equipment, consisting of a 125-hp. Westinghouse gas engine directly connected to a 75-kw. generator, to furnish light and power. An internal railroad system and some crane equipment have also been added to facilitate the handling of materials and the making of shipments.

At the Canadian Head of the Lakes.

TORONTO, October 19, 1907.—Alderman J. J. Carrick of Port Arthur has been in Toronto this week. He states that Mackenzie & Mann have given him positive assurance that the capacity of the Atikokan Iron Company's blast furnace plant will be doubled and large ore docks will be constructed, all within a few months. He also stated in a communication to the Port Arthur authorities that the company has a large iron property to develop as soon as an Eastern outlet for the railroad is provided at Port Arthur. Very favorable reports are received of the ore taken from the Atikokan Company's mine in the Atikokan range. The quality is said to be continuing to improve.

Of raw material, indeed, the furnace is not likely to have any lack, for besides the resources of the Atikokan range and the deposits hinted at in Alderman Carrick's communication there are the Loon Lake properties, a recent find in Connell Township, and another at Beck's siding. Further away is the hematite deposit at Nepigon, which has come into very prominent notice of late. American mining men are now examining this deposit, in which some port Arthur and Fort William men have held claims for 12 years. Nor are these the only iron fields upon which the furnace at Port Arthur can draw. For example, there is the Long Lake deposit, which is described as a hematite property. Iron ore bodies are not likely to remain hidden in the Port Arthur district, for prospectors there are now exceedingly active.

A Projected Steel Plate Mill.

H. S. Holt, president of the Kaministiquia Power Company, a Fort William enterprise, controlled by a group of substantial Montreal men, on a recent visit to Fort William, was asked if it was a fact, as stated, that he and his associates were prepared to finance a project for establishing a steel plate mill in that city. His reply is thus given in the *Fort William Times-Journal*:

We told Mr. Currie of the Imperial Steel & Wire Company that if he would come before us with a sound proposition, one that was practical, and not from the standpoint of a promoter, we, that is Mr. Hosmer, Mr. Thompson and myself, would undertake to do the financing.

Fort William is no doubt the place for such an industry on account of its being the best location for transportation of both raw material and the finished product in Canada.

For an Electric Iron Furnace.

James Conmee, M.P., in whose constituency Port Arthur is situated, recently addressed a joint meeting of the Municipal Council and Board of Trade of that city in favor of steps being taken for the establishment there of an electro-thermic iron furnace. He expressed his confidence in the official report of the results of the electric smelting experiments carried on under Government auspices at Sault Ste. Marie. He pointed out that Port Arthur has the only blast furnace in Canada using domestic ore exclusively. If domestic ore tributary to the city can be economically treated in a blast furnace Port Arthur, with its great resources of water power, should be able to make a success of electric smelting.

Speaking as a supporter of the Government, he expressed his belief that if works were established in good faith there would be no difficulty in getting the term of the bounty extended and possibly the rate increased. He added that he was so convinced of the feasibility of such an undertaking that he would be willing to invest in one that should be properly inaugurated. He was of the opinion that numbers of citizens would be equally willing to put money into an electric smelting plant. The matter is to receive further consideration.

C. A. C. J.

A Special Pyrometer Equipment.

The Wm. H. Bristol Combination Indicating and Recording Pyrometer.

The indicating and recording forms of the thermo-electric pyrometers invented by Prof. William H. Bristol have already been described in these pages—the first in *The Iron Age*, May 17, 1906, and the second, November 8, 1906. The apparatus illustrated in Fig. 1 is a combination of these two in connection with a single fire end, providing an indicating instrument at the operator's post of duty, and a recording instrument in the superintendent's office, which may be at a considerable distance from the point where the temperature is being measured. The indicating instrument is similar in appearance to a Weston voltmeter, and the recording instrument makes a continuous automatic record of the same temperature on a patented smoked chart, an example of which is shown in reduced fac-simile in Fig. 2. The outfit is intended for every day practical service in the iron and steel industries. A number are now in successful use in connection with blast furnaces and annealing furnaces, and it will

This combination unit of indicating and recording electric pyrometers is intended for continuous service, and the connections are so arranged that both instruments operate continuously—i. e., the recording instrument makes a continuous record of the same temperature shown on the scale of the indicating instrument at the same time. In this way the combination unit may be used to continuously indicate and record the temperature in any one furnace, but extra thermo-couples and connections are sometimes attached so that the two instruments may be connected to a large number of different furnaces. Special attachments for this purpose have been designed so that the two instruments may be switched from one furnace to another, either together or independently. When the outfit is designed for using the two instruments independently for any one of several different furnaces, two sets of switches are furnished. By one of these sets the recording instrument may be connected to any one of the furnaces at the same time that the indicating instrument is being switched from one to another of the same connections by means of the second set of switches. This provides new and advantageous possibilities, for a superintendent may have a continuous record of the temperatures of each furnace by making only one attach-

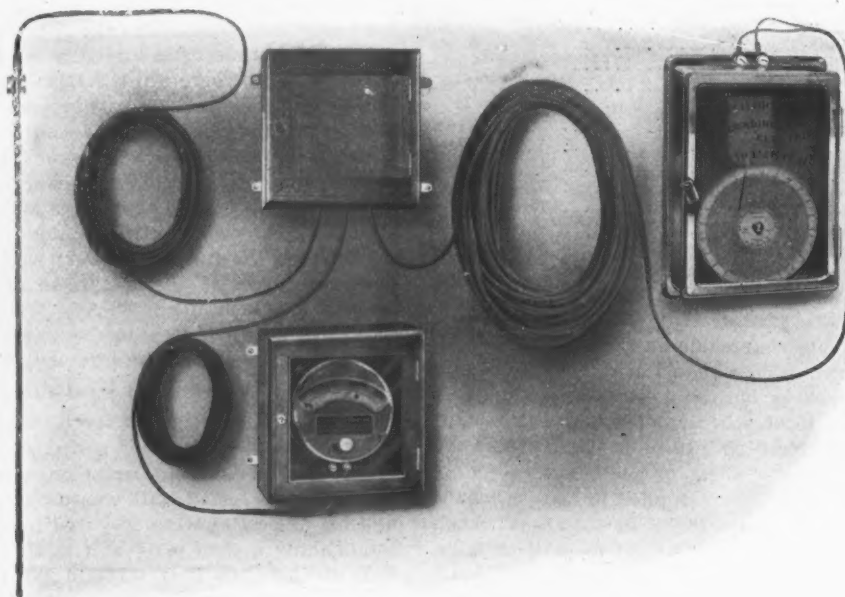


Fig. 1.—The Parts in the Combination Indicating and Recording Pyrometer Manufactured by Wm. H. Bristol, New York.

be readily appreciated that there are many other industrial applications in which they will be equally useful.

The complete apparatus consists of the following parts: The fire end, or thermo-couple, which is installed at the point where the temperature is to be measured; the indicating instrument, which is fastened to some vertical support at the place most convenient for the operator to consult it; the recorder, which is also installed vertically, either near to or far from the point where the temperature is being measured, wherever it would be of the greatest value in indicating and recording the temperature; the leads, or duplex cable, connecting the indicator and recorder to the fire end, and the switch box, which is located at the points where the leads from the fire end branch off to the indicating and recording instruments.

An explanation of the principle of operation was given in the previous articles mentioned. The small current of electricity produced by the thermo-couple actuates a galvanometer in the indicating instrument or in the recording instrument, the scales of which are calibrated to read directly in degrees of temperature. The electrical connections contained in the switch box are so arranged that either instrument may be disconnected and taken out of service at any time without interfering with the accurate operation of the other instrument, and by simply throwing switches both instruments may be tested for accuracy in comparison with a constant.

ment to each, while the operator of each furnace has at the same time a continuous indication of these temperatures for a guide at his post of duty. The advantages of this system include uniformity of operation, with the possibility for using cheap labor, as the skilled superintendent can control the temperatures used, from his own office. The moral influence on the operator of knowing that the superintendent can learn the temperatures used at any time without leaving his office has been found effective.

The chart, reproduced in Fig. 2, gives a record of the temperature of the gas at the top of a large blast furnace. It is interesting to note the frequent and wide variation in the temperature of this gas. It is lowered each time a new charge of iron ore, limestone and coke is put in, and the record therefore shows the blast furnace superintendent whether the charging was done regularly and whether the furnace was traveling well or "hanging up." This particular chart indicates very good operation between 1 p. m. and 2 p. m., as it shows that the furnace took three charges at regular intervals of 20 minutes during that hour, and that the stock was moving so well that the temperature at the top rose quickly again each time after being lowered by the charging. The record shown on the opposite side of the chart for the hour between 1 a. m. and 2 a. m. is very irregular, and shows that the furnace evidently "slipped" at 1.10 a. m., as the temperature rose very rapidly at that time from 550

degrees F. to 945 degrees F., though at 1.45 p. m. the temperature had been only 350 degrees F. The combination unit makes it possible for the superintendent to know these important facts about each furnace right up to the moment of observation without leaving his office, while at the same time the filler and blower of each furnace may have the same information by looking at the local indicating instrument. The indicating instrument is of such a character that it may be installed in the stock house at the foot of the skip hoist in a protection case secured to any vertical support. The recording instruments have been successfully used 1000 ft. from the point where the temperature was being measured.

It should be noted that though this combination unit is made up of several parts, it is nevertheless simple and easy to install. The two instruments are each mounted in protecting cases all ready to be fastened to the wall by means of four screws. The leads are fully insulated and are furnished in suitable lengths with each outfit, so that they may be fastened along any convenient overhead supports. The switch box is also held up by four screws, and is furnished complete with lock and key. Suitable protection tubes and fixtures for installing the fire end



Fig. 2.—A Record from a Recording Pyrometer of the Temperature of the Gas at the Top of a Blast Furnace.

are furnished to suit the particular conditions at the point where the temperatures are to be measured. The whole outfit may, therefore, be installed in a very short time by any mechanic of ordinary intelligence. The pyrometers are manufactured by William H. Bristol, 45 Vesey street, New York.

The Simplex Concrete Pile.—The Foundation Company, 115 Broadway, New York, publishes interesting details of the Simplex concrete pile. The method followed in putting down these piles is to drive a steel casing 16 in. in diameter and of $\frac{1}{2}$ in. metal, and fill in with concrete, afterward withdrawing the pipe. One of the driving forms has a cast iron point. Another is equipped with what is known as the alligator point. In the case of the cast iron point, the latter is embedded in firm ground and remains there. After the entire quantity of concrete required for the pile has been deposited by means of buckets through the open upper end of the form the latter is partly pulled up. The pressure of the concrete from above causes it to flow out through the open lower end of the form, filling the space occupied by the pipe and cementing itself into the surrounding ground. The alligator point is pulled up with the driving form, the jaws opening to the full diameter of the pipe and allowing the concrete to pass through as the point is pulled up. The Simplex system is controlled by the Simplex Concrete Piling Company, Tacony, Philadelphia, and the Foundation Company is its representative in New York.

New Jersey and Connecticut. Concrete piles were put in by the Foundation Company at the site of the new steel foundry of Isaac G. Johnson & Co., Inc., Spuyten Duyvil, New York.

The Baltimore Bridge Company.

In enumerating the trade interests of the city, a Baltimore daily says that the Baltimore Bridge Company probably takes the lead in carrying the name of Baltimore throughout this country and to various foreign countries on account of the wide field which it covers. This company has furnished important bridges and buildings not only in various States in this country, but also in Cuba, Porto Rico, Costa Rica, Guatemala and Panama. All of the bridges of the Transcontinental Railroad now building across Guatemala from the Atlantic to the Pacific were furnished by this company. It last year finished at Nipe Bay, Cuba, the construction of the largest sugar mill in the world, which was built for the Nipe Bay Company, this company being controlled by the group of capitalists who are at the head of the United Fruit Company. The Baltimore Bridge Company furnished all the material for this mill, including even the molasses tanks, and sent out its own erection plant and working force.

During the past year the company has been constructing at Locust Point, for the Baltimore & Ohio Railroad, the largest freight pier in this country, and has the contract for this building complete, including not only the steel work, but lumber, corrugated iron—in fact, everything in the make-up of the building. This building is nearly 1000 ft. long and 135 ft. wide, and when finished will be supplied with a complete system of carrying freight by electric trolleys, which will take freight from the vessel and deposit it at any point within the pier, or *vice versa*.

The company has many large contracts now under construction, including work for the Baltimore & Ohio, New York Central, Erie and Boston & Maine railroads. It has in the field a force of men erecting the piers and superstructure of a large bridge across the Changuinola River in Panama. This bridge is about one-quarter of a mile long, and includes one cantilever span across the main channel of the river nearly 400 ft. long. In addition to bridges and mill buildings, the company also furnishes steel work for modern fireproof structures, and at the present time has a contract for about 1200 tons of such material in the extension of the Bellevue Hospital, New York City. It furnished the steel work for buildings in Baltimore as follows: Crown Cork & Seal Company, Hotel Junker, Caswell Hotel, German Bank, Retail Market and the large new fireproof store of Bernheimer Bros. The shops of the Baltimore Bridge Company are on the Baltimore & Ohio Railroad at the corner of Busk street.

The Parkersburg Iron & Steel Company.—Last week the regular periodical inspection of the plant of the Parkersburg Iron & Steel Company, Parkersburg, W. Va., was made by the Board of Directors. The plant was found in the best condition that it has been since the inception of the company, and more men are employed than ever before. The inspection was followed by a meeting of the committee to outline the policy of the company as to additions and improvements to be made next year. This committee consists of C. F. Niemann, president; A. E. Niemann, vice-president; L. A. Meyran, N. S. Snyder and H. S. Duncan, directors; John Stephens, superintendent, and W. L. Danks, chief engineer. While it is possible that some additions will be made to the plant next year, this has not been fully decided. The company is having a large demand for its iron and steel sheets, inquiries for its special grade of Parkersburg Blue sheets being unusually heavy. These sheets are especially adapted for stamping work and other purposes for which high grade sheets are required.

The equipment of the plant of the Arthur Koppel Company, Koppel, Pa., includes a Northern electric generator built by the Northern Electrical Mfg. Company, Madison, Wis.

Trade Cycles.

The Periodic Rise and Fall in Prices, Wages, &c.

BY HERBERT FOSTER, NEW HAVEN, CONN.

The object of this article is to seriously consider the signs of the times from a business point of view, and to see if knowledge derived from past history in the business world makes possible a forecast of what may probably occur in years to come. Thoughtful students of economics admit, and business and financial men are obliged to corroborate the fact, that the rise and fall in prices of commodities, high and low wages, tight and easy money, prosperity and stagnation in the industrial

TABLE I.
RISE AND FALL IN PRICES, WAGES, & C.
FROM LOW TO HIGH, HIGH TO LOW, & C.

RIISING PERIODICITY	YEARS	FALLING PERIODICITY	COMPLETE CYCLE
4 YEARS	1796		
	1800	7 YEARS	
3 "	1807		
	1810	8 "	
2 "	1816		
	1818	9 "	27 YEARS
	1823		
4 "	1827	7 "	
	1834		
3 "	1837	8 "	
	1843		
2 "	1845	9 "	27 YEARS
	1850		
4 "	1854	7 "	
	1861		
3 "	1864	8 "	
	1870		
2 "	1872	9 "	27 YEARS
	1877		
4 "	1881	7 "	
	1886		
3 "	1891	8 "	
	1897		
2 "	1900	9 "	27 YEARS
	1904		
4 "	1908	7 "	
	1915		
3 "	1918	8 "	
	1924		
2 "	1926	9 "	27 YEARS
	1935		

world, crises and panics, all occur at more or less regular intervals. That these intervals or cycles follow perfectly regulated, immutable laws, this article will endeavor to demonstrate.

Only a short while ago certain men declared that panics would be impossible in this enlightened country because of the vastly improved machinery of finance. After the several "flurries" of the past few months these men are not so sure about the efficacy of the improved financial machinery. Secretary Wilson of the Department of Agriculture states that there will be no more serious crop failures in the United States. It is to be hoped there will not be any, but, although science is helping the farmer wonderfully, there are still bound to be "lean years" as well as "fat" ones. The fault with most theories concerned with matters influenced by natural laws is that they do not make sufficient allowance for what an inscrutable Providence deems best for the children of men at various times.

The series of tables herewith the reader is invited to study seriously:

TABLE II
THE TOP NOTCH YEARS OF HIGH PRICES,
HIGH WAGES, & C.

TOP NOTCH YEARS	PERIODICITY	COMPLETE CYCLE
1800	10 YEARS	
1810	8 "	
1818	9 "	27 YEARS
1827		
1837	10 "	
1845	8 "	
1854	9 "	27 YEARS
1864	10 "	
1872	8 "	
1881	9 "	27 YEARS
1891	10 "	
1899	8 "	
1908	9 "	27 YEARS
1918	10 "	
1926	8 "	
1935	9 "	27 YEARS

From these tables it will be seen that the years of rise and fall in wages, &c., are regulated to move in repeated periods of 4, 3 and 2 high years, alternating with 7, 6 and 5 low years in a total cycle of 27 years (Table

TABLE III
LOWEST YEARS IN DEPRESSION OF BUSINESS,
LOW PRICES, LOW WAGES.

LOW EBB YEARS	PERIODICITY	COMPLETE CYCLE
1796	11 YEARS	
1807	9 "	
1816	7 "	27 YEARS
1823		
1834	11 "	
1843	9 "	
1850	7 "	27 YEARS
1861	11 "	
1870	9 "	
1877	7 "	27 YEARS
1888	11 "	
1897	9 "	
1904	7 "	27 YEARS
1915	11 "	
1924	9 "	
1931	7 "	27 YEARS

I); the top notch years of high prices, high wages, rushing business, &c., in repeated periods of 10, 8 and 9 years, or a total cycle of 27 years (Table II), and low ebb years in repeated periods of 11, 9 and 7 years or a total cycle

of 27 years (Table III). Observe that while each has its independent, subordinate cycles, as a whole it moves in a complete cycle of 27 years.

By reference to the tables of crises and panics it will

YEARS	PERIODICITY	COMPLETE CYCLE
CRISIS 1803	16 YEARS	54 YEARS
CRISIS 1819	18 "	
PANIC 1837	20 "	
CRISIS 1857	16 "	54 YEARS
CRISIS 1873	18 "	
PANIC 1891	20 "	
CRISIS 1911	16 "	54 YEARS
CRISIS 1927	18 "	
PANIC 1945	20 "	
CRISIS 1955	20 "	

be noticed that the repeated periods are of 16, 18 and 20 years, with a complete cycle of 54 years (Table IV), and repeated periods of 38, 36 and 34 years, with a complete cycle of 108 years (Table V). The cycles are, therefore, 27, 54 and 108 years. Strange as it may seem to some, these cycles are synchronous with astronomical

YEARS	PERIODICITY	COMPLETE CYCLE
CRISIS 1795	38 YEARS	108 YEARS
PANIC 1833	36 "	
CRISIS 1865	34 "	
CRISIS 1903	38 "	108 YEARS
PANIC 1941	36 "	
CRISIS 1977	34 "	
CRISIS 2011	34 "	

cycles of the solar system, therefore seem bound to recur at their stated periods as regularly and as surely as the tides ebb and flow.

The time for high and low water is calculated, ac-

Business then steadily improved for three years, ending with a panic in 1891. Everything then went steadily down the next six years, until the bed-rock was again reached in 1897. The following two years trade picked up and the top notch was reached in 1899. Business then slacked off again during the next five years, ending 1904, punctuated by a crisis occurring in 1903. These years have been selected as an illustration for the reason that they are still fresh in the memory of the present generation of business men, who can for themselves confirm the accuracy of the statements. There are, no doubt, many who will be able to substantiate the accuracy of the previous cycle also.

Since 1904 there has been a steadily increasing volume of trade—a volume unprecedented in the history of the country; high prices, high wages, high living—everything

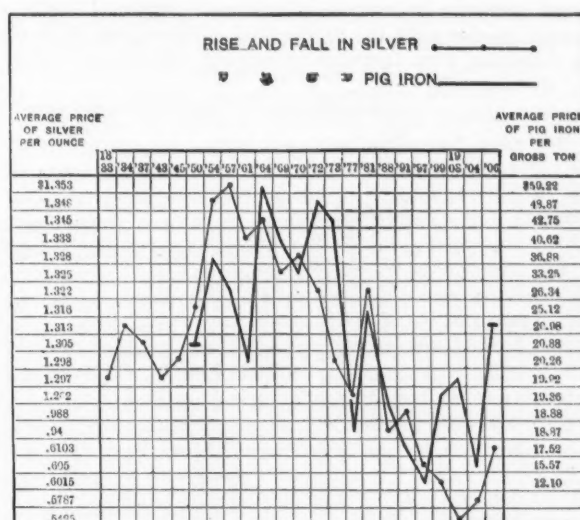


Fig. 2.—Illustrating the Rise and Fall in Prices of Silver and Pig Iron.

high. According to the tables of cycles this condition should, with some minor variations, prevail until the end of 1908; the following three years be full of intense excitement, wild speculation, &c., culminating in a crisis in 1911, after which a period of depression should supervene, the very low level to be reached in 1915. Time alone will tell if these forecasts are correct.

It is important to understand that these tables are for general conditions affecting the country as a whole. There may be disturbances which will affect localities. As an instance, witness the flurry in financial circles in the East in July and August of this year. The far West and other parts of the continent were not, in any great measure, affected, it being a purely local disturbance. Another factor is a Presidential election year, which always causes uneasiness and uncertainty until the out-

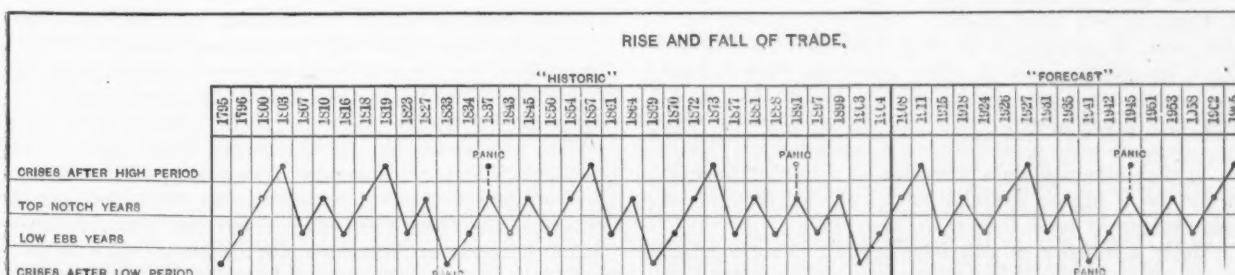


Fig. 1.—Graphic Chart Illustrating the General Rise and Fall of Trade from 1795 to 1904, and Continued Upon the Same Cycles to 1965.

cording to locality, with the utmost precision and nicety, and, if necessary, these tidal tables can be calculated for years in advance. There seems to be no valid reason why business cycles may not be calculated and anticipated also.

The reader will observe that the tables show that the year 1888 was the bottom year of a period of depression.

come is assured. In like manner a war, with its far-reaching consequences, would be a factor also.

Attention is directed to the graphic chart. Fig. 1 illustrates graphically the rise and fall of prices, wages, &c., as outlined in the subject matter of this article. Following the line from left to right, the first part, that from 1795 to 1904, is historical—that is, it has passed

It is then continued, as in the tables, upon the same cycles, up to 1905 as a forecast. Fig. 2 illustrates the rise and fall in prices of pig iron and silver for the corresponding period as far as data was obtainable.

In addition to the ordinary price regulating effect of supply and demand, the great increase in volume produced must be taken into consideration; the wonderful development and progress made within the past three decades in methods of manufacture tended to lessen the cost of production and increase the output, and consequently had the natural tendency to prevent the higher level in prices being reached for the same commodities which prevailed previous to the time specified.

Fig. 3 illustrates the cost of flour for the corresponding period. This staple was chosen as an example for the reason that it is the commonest necessity of life. As in the case of the production of pig iron and silver, the great increase in volume of amount produced being a factor, so also with the production of flour must be borne in mind the vast increase in acreage devoted to wheat,

by Samuel Benner of Ohio, published in Cincinnati, and an article and chart on "Wealth and Wages Cycles," by Prof. C. A. L. Totten, New Haven, Conn. There is also an English publication by R. C. Carrington, "Observations of the Spots of the Sun," in which the author compares the frequency of the sun spots with the price of wheat, &c. Another English article is from the pen of Stanley W. Jevons.

The careful navigator does not trust to luck, but always heeds changes, and when, by reason of his past experience and with the aid of scientific knowledge at his command, he is able to detect any indications of an approaching storm or stress of weather, he prepares, as far as possible, to weather it. This article is written with a similar end in view; that the signs of the times through the experience of the past may be taken advantage of.

The attainment of true success in business or any other path of endeavor depends not always so much upon the element of luck as on cleanly living, the conservation of energy, ability to absorb knowledge derived from past ex-

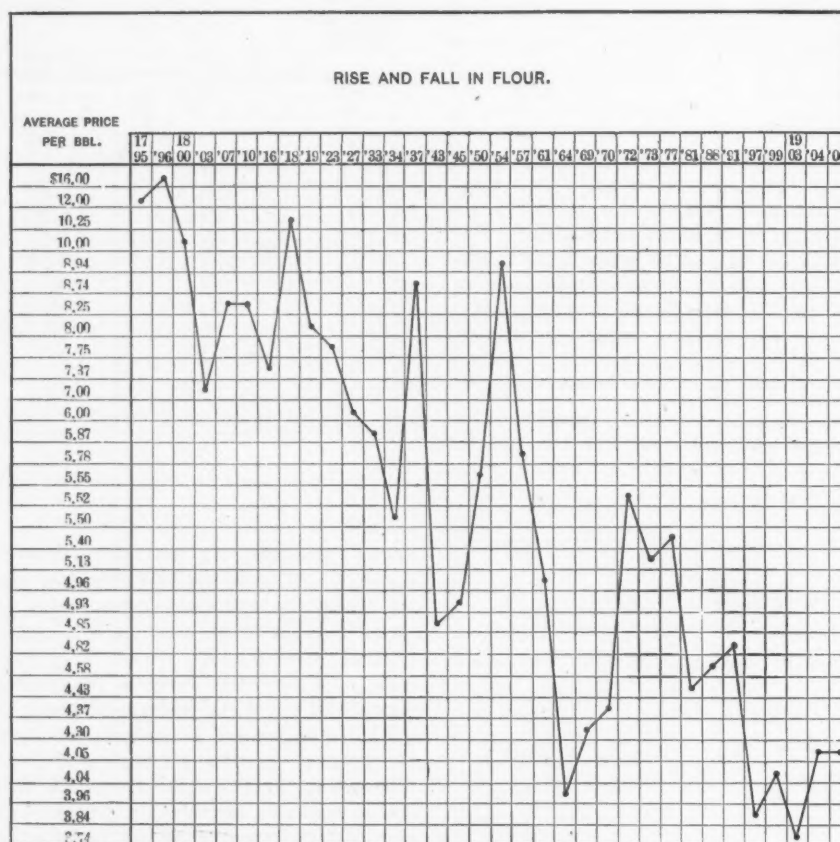


Fig. 3.—Graphic Chart Illustrating the Cost of Flour from 1795 to 1906.

the many inventions in farm machinery and for the manufacture of flour itself. Thus, while for flour the general average price is considerably lower, the cost of living as a whole is very much higher. As partly accounting for this must be considered the fact that what in this country a few decades ago, in many instances, were classified as luxuries are now recognized as necessities of life, and, in a great measure, for the average persons, justly so. Custom, once established and continuously assented to, in time becomes law. Therefore, the natural tendency would be a higher average cost of living for the past two decades at least than in former years.

Quite a number of eminent authorities on economics in America, England and the Continent have devoted a great deal of study and have written books and articles on financial and commercial depressions and panics. A few of these publications are usually available for reference in the public libraries. In several of the English universities trade cycles are considered of such importance as to be included in lecture courses in their departments of commerce and economics.

Some writers have studied the subject of rise and fall, panics, &c., with special reference to their conjunction with astronomical cycles. Among these works or articles are: "Prophecies of Future Ups and Downs in Prices,"

perience, and then to adapt oneself and make practical application of this knowledge.

Columbia University, New York, will offer at night during the year 1907-1908 20 evening courses specially adapted to the needs of technical and professional workers. This includes work in applied mechanics, architecture, electricity, fine arts, industrial chemistry, mathematics and surveying and structures. The work begins October 28 and continues for 25 weeks. A full description of the courses is contained in the announcement of extension teaching, which may be obtained on application to the Director of Extension Teaching.

The Association of Railway Superintendents of Bridges and Buildings held its seventeenth annual convention at Milwaukee, Wis., October 15 to 18. Special trips were taken to the plants of the Bucyrus Company, the Allis-Chalmers Company and the Wisconsin Bridge & Iron Company. On Friday, the Wisconsin Bridge & Iron Company entertained the convention at luncheon at the Deutscher Club. In connection with the convention there was an exhibit of bridge appliances, roofing and paints. The next convention will be held at Washington, D. C.

The American Electrochemical Society.

New York Meeting, October 17 to 19.

The twelfth general meeting of the American Electrochemical Society was held in New York City, October 17, 18 and 19. During the convention the official headquarters were in the Chemists' Club, 108 West Fifty-fifth street, where the Thursday and Friday sessions were held, and the hotel headquarters at the Hotel Cumberland. Following a meeting of the Board of Directors Thursday evening, the convention was formally opened in the lecture hall of the Chemists' Club, where the president, Prof. C. F. Burgess of the University of Wisconsin, and other officers of the society received the members and guests. Occasion was taken at this time to exhibit novelties in electrochemical apparatus and products, including deflocculated graphite and products made from or containing it, and Wm. H. Bristol's electric furnace and recording pyrometers. The evening was concluded with an illustrated lecture by Dr. George F. Kunz on "Diamond and Moissanite: Natural, Artificial and Meteoric," and one by E. G. Acheson on "Deflocculated Graphite," with demonstrations and experiments.

The First Professional Session

was held Friday morning at the same place and gave attention to the presentation and discussion of the following papers:

"On the Electrothermic Reduction of Iron Ores," by Albert E. Greene and Frank S. MacGregor; "Discussion of the Electric Furnace Experiments for the Production of Pig Iron at Sault Ste. Marie," by Prof. Joseph W. Richards of Lehigh University; "Electric Furnace Experiments," by H. N. Potter; "The Metals in Order of Their Boiling Points, as Arranged from Moisson's Electric Furnace Experiments," by Oliver P. Watts; "The Electrometallurgy of Zinc," by Gustave Gin; "A New Application of Chlorine in Metallurgy," by C. E. Baker; "The Heat Conductivity of Carbon," by F. A. J. Fitzgerald; "Granular Carbon Resistors," by S. A. Tucker, A. Doty and R. W. Cauchois, and "Electrochemical Methods for the Qualitative and Quantitative Determination of Free Silicon in the Presence of Silica, Oxides, Free Carbon and Carborundum," by W. R. Mott.

Excursion to the Edison Laboratories.

After lunch at the Hotel Cumberland about 300 of those in attendance took part in an excursion to the laboratories of Thomas A. Edison at Llewellyn Park, Orange, N. J., where they were received by Mr. and Mrs. Edison. An opportunity was given to examine much of the experimental apparatus which has played or is still a part in the development of the Edison electric light, phonograph, storage battery, &c. A particularly unique new invention is a system of iron molds, with which it will be possible to practically pour at one operation a complete concrete house 25 ft. wide, 45 ft. deep and three stories high. A large model of the house exhibited was surprisingly attractive and ornate, considering the manner in which it is to be erected. The purpose of the scheme is to provide a cheaper way of building for those in moderate circumstances. It is claimed that the cost of the house will not exceed \$1000 and that it can be built in 12 hr. It is intended to accommodate three families and will be entirely fireproof in its construction, as even the floors are to be of concrete, except where a strip of wood is inserted around the edges so that carpets may be tacked down. The Edison storage battery, which has been so long withheld because the inventor was not satisfied with its endurance, it is now announced, is perfected and will be ready for the market next December.

The principal social function of the convention was the dinner Friday evening in Liederkrantz Hall and was very largely attended.

The Second Professional Session

was held Saturday morning in Earl Hall at Columbia University and was given over to the consideration of the following papers: "Physico-Chemical Notes on the Alkali Aluminates," by P. B. Sadtler; "Action of Ammonium Persulphates on Metals," by J. W. Turrentine; "Note on the Use of the Capillary Electrometer for Alternating

Voltages," by M. G. Floyd; "Electroscopic Determination of Radium in Some Tufa at Hot Springs, Arkansas," by Herman Schlundt; "Electrolytic Separation of Silver and Copper," by H. W. Gillett; "Electrolytic Determination of Minute Quantities of Copper," by E. E. Free; "Electrolytic Reduction of Nitric Acid," by H. E. Patten and A. Robinson; "The Treatment of Storage Battery Elements Before Putting Them Out of Commission," by O. W. Brown and R. R. Sayers; "A Further Contribution to the Study of Concentration Cells," by Henry S. Carhart and F. J. Mellencamp; "On the Nature of Electrolytic Conductors," by L. Kahlenberg, and "The Electrolytic Theory of the Corrosion of Iron," by Dr. A. S. Cushman. The last paper was in substance the same as that presented by the author at the meeting of the American Society for Testing Materials at Atlantic City, June, 1907, a synopsis of which appeared in *The Iron Age*, June 27, 1907.* A further contribution was made by H. N. Potter, supplementing his paper of the previous day in which he told something of the production of a mixture having a silicon and oxygen base in the electric furnace. This substance exhibits peculiar properties, probably due to the presence of silicon monoxide, from which it takes its name, Monox. The characteristics and behavior of the material were described and its uses in the arts; for example, as a protective coating for iron and steel to prevent rusting, and as an ingredient in paint and printers' ink, to which it imparts desirable properties.

In the afternoon there were two excursions, one to the Pennsylvania Railroad Company's new power plant at Long Island City and the New York Electrical Testing Laboratories, and the other to the United States Metals Refining Company at Chrome, N. J. Those who participated in the latter excursion had the privilege of inspecting copper smelting, converting and electrolytic refining, and the electrolytic refining of doré bullion as carried on in this plant.

The society was entertained in the evening by the Chemists' Club with a smoker in the assembly room of the club.

The Ajax Iron Works.—The Ajax Iron Works, Corry, Pa., manufacturer of steam, gas and gasoline engines, is completing the erection of a large addition to its plant, consisting of a reinforced concrete and steel building, 80 x 175 ft. The company manufactures a line of commercial gas engines, ranging from 5 to 100 hp., but having a good field for larger sized units of this type, has decided to build them up to 400 hp. The new addition is to be used exclusively as a machine shop, and both sides of the building will have a gallery for light manufacturing purposes. It will be served by a 5-ton Morris Brothers' electric traveling crane. The machine tool equipment has been contracted for, and will be installed in a couple of weeks. Some of the larger tools will be motor driven, while the smaller tools will be operated from line shafting driven by electrical apparatus, all of which will be furnished by the Bullock Company. The new addition will be placed in operation the latter part of November.

Rolling Nickel Sheets.—Referring to the increasing call for nickel, now that the malleable grade can be obtained at the same prices as other grades and in a form for rolling, the *Brass World* gives suggestions concerning the manufacture of nickel sheets: The slabs should be rolled hot or "broken down" to about $\frac{5}{8}$ in., then scraped on an overhauling machine, and finally finished cold. In this manner, sheet nickel with a good surface may be obtained. Experiments conducted by the largest producer of nickel in the United States have shown that the best temperature for hot rolling is about 1350 degrees C. (2462 F.). The majority of mills which roll copper are not in a position to obtain this heat in their heating surfaces when copper rolling is being done. When nickel is rolled, therefore, they do not heat it sufficiently hot and it cracks in the rolls. At the above mentioned temperature it is quite soft, and may be rolled without difficulty.

* A full account of Dr. Cushman's experiments was printed in Bulletin No. 30 of the Department of Agriculture, and a liberal abstract of this with illustrations was given in *The Iron Age* August 8, 1907.

Zinc in the Iron Blast Furnace.*

BY JOHN J. PORTER, CINCINNATI, OHIO.

Unusual problems have arisen at certain iron blast furnaces in Virginia through the fact that the ore supplies, derived from the Oriskany formation, contain from a trace up to 1 per cent. of zinc oxide. The course of zinc through the blast furnace is readily traced. Entering the throat as zinc oxide, finely disseminated through the ore, it descends unchanged to the fusion zone, since a temperature of 1000 degrees C. or more is required for its reduction. At the fusion zone the zinc oxide is reduced by solid carbon to metallic zinc, which is set free as vapor and rises with the ascending gases to the cooler zones of the furnace. In cooling through the range of temperature from 1000 to 500 degrees C. the zinc is re-oxidized according to the reaction $Zn + CO_2 = ZnO + CO$, and the resulting zinc oxide, being in a very fine state of division, is readily carried along by the ascending gases. Portions, however, deposit on the descending stock and are carried down, again to pass through the same cycle of changes. Still other portions deposit on the lining of the stack and gradually form hard masses of "cadmia." Of the remainder of the zinc oxide the greater part passes out of the furnace and is either deposited in the downcomer, dust trap, stoves, boilers and flues, or passes through the chimney into the atmosphere. A small portion escapes reduction and enters the slag as zinc oxide, while still another portion is absorbed into the lining of the furnace.

Although a quantitative estimate of the final distribution of the zinc oxide charged into a furnace is attended with much difficulty and uncertainty, the following approximate results, covering a period of six months at one plant, may be of interest. The figures are percentages of the total zinc oxide charged into the furnace during the period, as determined from the weight of ore used, and the average percentage of zinc contained therein:

	Per cent.
In furnace cadmia (weighed).....	8
In downcomer deposits (weighed).....	9
In flue cadmia (weighed).....	13
In flue dust (estimated).....	9
In dustcatcher dust (estimated).....	8
Absorbed in hearth and bosh lining (weighed).....	4
Absorbed in inwall lining (estimated).....	5
Eliminated in slag (calculated).....	12
Lost at furnace top through the lowering of bell (calculated)	9
Unaccounted for and error, in stoves, boilers, chimney flues and lost through draft stack (difference).....	23

The difficulties which arise from the presence of zinc in the blast furnace may be divided into three classes, according to the causes: 1, Mechanical action; 2, physical action; 3, chemical action.

Mechanical Action.

Under this head are such troubles as the choking of the stove checkers and gas flues by the zinc oxide dust, and the obstruction of the downcomer and furnace throat by cadmia formations. These formations are of considerable interest and have been noted in technical literature. They form a ring adhering to the lining just below the point where the stock strikes in charging, which frequently attains sufficient thickness to obstruct seriously the passage of the stock and gases. In furnaces having a single point of take-off for the gases the tendency is for the cadmia to deposit chiefly on the side opposite this point, which destroys the symmetry of the stock line and causes an uneven distribution of the stock, with all its attendant evils.

The cadmia has a stratified structure, is greenish gray in color, is exceedingly hard, heavy and tough, and closely resembles the mineral zincite in all physical properties. It usually contains from 85 to 90 per cent. of ZnO , and from 0.5 to 1 per cent. of metallic zinc.

In the early days of the iron industry of Virginia these cadmia deposits were not recognized as having any value and large quantities were thrown on the dumps. The application of chemistry to blast furnace practice,

however, caused the value of the cadmia to be recognized, and now it is considered an asset of sufficient importance, when recovered, to offset largely the difficulties attending its presence in the furnace.

The prevention of the difficulties due to mechanical action is quite simple, and for the most part very effective. Two-pass stoves, with wide checkers and overhead flues, practically eliminate any troublesome clogging. A downcomer of ample size and proper inclination will usually remain free from obstructions during an average blast, while if an obstruction should form a stop of a few hours will suffice to cut out the cadmia at the throat, where it deposits the thickest.

METHODS OF REMOVING CADMIA.

The removal of the cadmia formed in the furnace itself is more difficult. The old time remedy was to blow out the furnace every six months and remove the deposits. A variation practiced by some adventurous furnacemen was to bank the furnace and cut out the cadmia from a swinging scaffold; but in this case it is needless to say that the work was not accomplished without the "gassing" of every one employed on the job.

In recent practice encouraging results have been obtained by the use of cast iron stock linings. The zinc oxide apparently does not adhere to the iron with any considerable tenacity and any thin coating that forms is cracked off, leaving the plates clean. Water cooled plates also have been tried, but they are no more effective than the plain ones, while they are quite liable to crack and allow the water to leak into the stack and backing. In one case this leakage caused a serious scaffold, the cause of which remained unsuspected for some time.

One result of the cast iron stock lining, which was not anticipated, was the formation of a cadmia deposit on the brick lining lower in the furnace. It had been thought that the wear of the stock would prevent any accumulation there, but in one instance which came to my notice a zinc ring, about 1 ft. thick and 3 ft. wide, was found at this point after a blast of nine months. The deposit, however, was much smaller than would have formed if the iron plates had been omitted; moreover, its thickness was nearly uniform, so that there was but little effect on the distribution of the stock.

Physical Action.

Under this head are included the disturbances due to the absorption of heat by masses of zinc oxide which reach the hearth. These masses may come either from a cadmia deposit at the stock line or from a scaffold or other accumulation lower in the furnace. In explanation of this latter assertion it should be said that zinc oxide possesses the power of entering into these accumulations to an almost incredible extent and greatly augments the difficulties due to them. It is not generally so recognized, but I believe that zinc oxide not only enters into the scaffold after its formation, but also very greatly increases the tendency to form these accretions. This opinion is based largely on the great tenacity with which zinc oxide adheres to the lining.

In an earlier article on this subject,* I took the ground that a "zinc slip," or fall of zincy material to the hearth, would have no material effect on the working of the furnace, my opinion being based on calculations of the theoretical heat absorption caused by the fall of 1 ton of cadmia deposit. Later experiences have caused me to modify this view to some extent. It is probably true that a fall of cadmia deposit coming at a time when the furnace is hot will cause only a slight chilling, and will not, as a rule, affect the grade of the iron. The fall of a scaffold or scab containing a large proportion of zinc, however, is a more serious matter, since the heat demanded for the reduction and volatilization of the zinc is taken from the hearth of the furnace at the time when it can least be spared.

PECULIAR CONDITION AFTER A SLIP.

After a heavy slip of this character the cinder comes up black and glassy, fumes strongly of zinc oxide and shows little blue flames of burning zinc as it runs down the gutter. The gas at the top of the furnace when the bell is lowered burns with a white flame and gives off dense

* Read at the Toronto meeting, July, 1907, of the American Institute of Mining Engineers. The writer is associate professor of metallurgy in the University of Cincinnati.

* The Iron Age, March 24, 1904, page 10.

yellow fumes of zinc oxide. At some of the older furnaces, having badly cracked crucible jackets, it is not uncommon to find metallic zinc oozing out of the cracks at such times. The change in the condition of the furnace takes place very suddenly, and as a rule the greater portion of the zinc is eliminated from the hearth within 3 or 4 hr. There is usually a second less marked appearance of zinc in the hearth about 10 or 12 hr. after the first one, and occasionally a third after still another interval. These I attribute to the deposition of a portion of the zinc as oxide upon the stock at a certain zone in the furnace, whereby it is returned to the hearth. I have never been able to detect zinc in the cast iron made during these periods, and it only enters the slag to the extent of a few hundredths of 1 per cent., or but slightly in excess of the normal amount. This seems rather remarkable, and I am at a loss to explain it satisfactorily.

The cooling effect exerted by the zinc oxide in the hearth of the furnace is made up as follows: Heat necessary to raise the temperature of the zinc oxide from, say, 800 degrees C. to 1300 degrees C.; heat absorbed by the reduction of zinc oxide by carbon; latent heat of fusion of the resulting zinc, and latent heat of evaporation of the zinc. (Since the subsequent condensation and re-oxidation of the zinc take place in the higher zones of the furnace, the heat developed is not available in the hearth and need not be considered here.) Based on a quantity of 1 lb. of zinc oxide, the loss of heat in pound-calories in the items just enumerated is:

	Calories.
Sensible heat absorbed, 0.15×500	75
Heat of reduction, $1051 - 356$	695
Latent heat of fusion.....	22.5
Latent heat of evaporation (approximately).....	425
Total.....	1217.5

Assuming that 1 lb. of coke in the blast furnace develops 3800 calories, it is evident that 0.32 lb. of coke will be necessary to furnish the 1217.5 calories, while an additional 0.148 lb. of carbon, or, say, 0.165 lb. of coke, is consumed in the reduction reaction, making a total of 0.485 lb. of coke for 1 lb. of zinc oxide.

In order to prevent any possible misunderstanding, it should be noted that, while these figures refer to the heat lost to the hearth of the furnace, the calculations given in my former paper, previously referred to, deal only with the heat lost to the furnace as a whole. This is the chief cause of the considerable difference in the two results.

The only method which has been developed to correct this disturbance is the crude one of charging extra fuel upon the first indications of a "zinc slip." Probably in this case "an ounce of prevention is worth a pound of cure," and extreme care to prevent the formation of scaffolds would be of more benefit than anything else. It is unfortunate, therefore, that the poor blowing equipment and the absence of proper stocking facilities at many of the plants in Virginia cause them to run irregularly and render them particularly liable to this form of trouble.

Chemical Action.

Under this head may be discussed the action of zinc oxide on the fire brick lining of the furnace. It is unusual for a furnace in this district to run more than a year without relining the hearth and bosh, and although not generally so recognized, I believe that the presence of zinc oxide is the chief cause of this deterioration. An examination of the lining remaining in these furnaces after blowing out reveals the following facts: The bricks in the hearth and lower part of the bosh are very soft and of a greenish-black color. They contain considerable carbon and 40 per cent. or more of zinc oxide, while small yellow crystals of the zinc oxide are abundant. Higher up in the furnace the bricks are firmer and contain less zinc oxide and carbon, while above the mantle the structure is unchanged, but the color is deep blue. Analysis shows only a trace of carbon, with about 20 per cent. of zinc oxide. The blue color is commonly attributed to zinc by the furnacemen of the district, but as I have noticed it in other furnaces not using zincy ores I am disposed to attribute it to the presence of titanium in the brick. The researches of Dr. Steger have

shown that titanitic acid gives a blue color to kaolin when heated to a high temperature, and it is well known that many, if not most, of our fire clays contain appreciable amounts of this element.

Dr. Steger, in an investigation of the cause of the disintegration of zinc muffles, found that the zinc vapors attack the clay substance according to the reaction $Al_2O_3, 2SiO_2 + Zn + CO_2 = Al_2O_3, ZnO + CO + 2SiO_2$, forming zinc spinel and tridymite. Willemite ($2ZnO, SiO_2$) is also formed. Dr. Muehlhauser finds that the formation of zinc spinel takes place principally when the muffle is still new and porous. The absence of a glaze on the side next to the fuel allows the gases to diffuse into the walls of the muffler, where, meeting the zinc vapors, the reaction takes place.

The work of Dr. Steger and Dr. Muehlhauser affords a very clear explanation of the action of zinc on the iron blast furnace lining, although it does not account for the presence of finely divided carbon or of free zinc oxide. This latter, however, probably results from the fact that the lining is considerably cooler than the hearth space, permitting the oxidation of zinc by carbon dioxide. It is assumed that zinc spinel forms at temperatures above the reduction point of zinc oxide, which is more than 1000 degrees C., and this being true the clay would be attacked on the interior surface of the lining with a formation of zinc spinel, while farther out, where cooler from radiation, there would be deposition of zinc oxide without disintegration of the brick. It is actually found that the bricks on the inner surface of the furnace are badly disintegrated, have lost all trace of the original structure, and are so soft that they can be crumbled between thumb and finger, while farther back the structure of the brick begins to show; it is harder and the yellow crystals of zinc oxide are abundant. These observations show that theory and fact are in close agreement.

So far as I am aware, no experiments have been tried with the object of reducing the action of the zinc on the lining of the iron blast furnace. It is improbable that anything could be done with a glaze, since the wear of the lining is comparatively rapid. A series of experiments to show the relative resistance of the various brands of fire bricks to the action of zinc vapors would undoubtedly lead to beneficial results, and in view of the possibility of lengthening the life of the lining and thereby securing a longer campaign for the furnace it seems well worth while to undertake the experiments suggested.

The Marquette, Mich., charcoal blast furnace of the Cleveland Cliffs Iron Company, has made a record of four and a half years of continuous operation. More remarkable still is the record of the Gladstone, Mich., furnace of this company, which has been in continuous operation more than six years and seven months, according to an article in the *Engineering Record*. The average campaign of a Lake Superior charcoal furnace is about two years. Both furnaces are equipped with the Farrell bosh jacket, used in connection with the Gayley bronze-bosh plates. The Farrell jacket prevents the tipping or sagging of the bosh plates and the moving of the bosh brick through expansion or contraction.

The northern set of tunnels under the Hudson River now being built by the Hudson Companies, running from Hoboken, N. J., to Christopher street, New York, is to be ready for traffic December 1, which is a month earlier than was expected. There are trolley tunnels which will carry passengers to New York both from Jersey City and from the terminal of the Delaware, Lackawanna & Western Railroad in Hoboken. The southern set of tunnels, running from Jersey City to Cortlandt street, New York, is rapidly approaching completion.

In one turn of 12 hr., the universal mill of the Carnegie Steel Company at the South Sharon Works, South Sharon, Pa., rolled 471 gross tons of steel against the best previous record of 416 tons, made last April. In one later turn of 12 hr., this mill made 426 tons of steel, also beating the best previous record made last April.

The Magnitude of the Baldwin Locomotive Works.

The *Journal* of the Franklin Institute for October contains the report of the Committee on Science and the Arts as the result of its investigation of the development of the American locomotive as exemplified in the Baldwin Locomotive Works of Philadelphia. The following summary of this industry to date, based on an annual output of 2600 locomotives, is given in the report:

Number of men employed.....	19,000
Hours of labor per man per day.....	10
Principal departments, run continuously, hours per day..	21
Horsepower employed:	
Steam engines.....	12,138
Oil engines.....	4,850
Number of buildings comprised in the works.....	47
Acreage comprised in works:	
Philadelphia	17.8
Eddystone	184.0
Acreage of floor space comprised in buildings.....	63.2
Number of dynamos for furnishing light (arc).....	16
Number of dynamos for furnishing light (incandescent)...	7
Horsepower of electric motors employed for power transmission, aggregate.....	14,200
Number of electric lamps in service (incandescent).....	7,000
Number of electric lamps in service (arc).....	951
Number of electric motors in service.....	1,115
Consumption of coal, in net tons per week, about.....	3,000
Consumption of iron, in net tons per week, about.....	5,000
Consumption of other materials, in net tons per week, about	1,460

When it is considered that in no year did the total number of engines built reach 1000 prior to 1900, the total of 2652 engines in 1906 is remarkable. Of this number 281 engines were exported and 133 were compounds. In

furnace will have improved stock handling arrangements and other up to date equipment.

The Standard Marking Table.

A very handy table to facilitate marking small pieces, such as details and connections, plates and angles in structural fabricating plants, car works, shipyards, &c., is being built and placed on the market by the Standard Bridge Tool Company, Pittsburgh, Pa. The operation is very simple and rapid. Pulling the hand lever down puts the spring in tension, which in turn brings the lower lever down on the table. The templet is fastened to the fingers of the latter lever.

If plates are to be marked they can be piled directly under lever and templet and the tension of the spring will hold the templet securely against the piece leaving



A Table for Laying Out Metal Work, Built by the Standard Bridge Tool Company, Pittsburgh.

1906 five locomotives of the Mallet type were built for the Great Northern Railway Company. A new feature in these locomotives, introduced by these works, was the addition of a two-wheeled radial truck at each end of the engine. This results in better curving qualities and reduces the flange wear on the leading pair of driving wheels. These engines are the heaviest thus far constructed in the experience of the works. The total weight of the locomotive is 355,000 lb. The weight upon the drivers is 316,000 lb. The weight of the engine and tender is 503,000 lb. These locomotives are doing excellent service and 40 additional ones have already been ordered.

The Empire Steel & Iron Company has made plans for the remodeling of its blast furnace plant at Reading, Pa. The two old stone stacks of the Henry Clay furnaces will be torn down and replaced with one furnace having an iron shell, and designed to produce about 200 tons a day, or nearly twice the present output. The new

the operator both hands free to work. To release the piece after marking the operator depresses the foot lever, which raises the templet. The piece is then removed and the templet allowed to descend on the next piece and the operation is repeated. In marking angles, the templet can be fastened to the lever fingers as before, but only one piece can be handled at one time, as angles cannot conveniently be piled upon one another.

The efficiency of the arrangement is obvious, the material to be marked can be piled on one end of the table, which is made amply long for this purpose, and be within easy reach of the operator, who can work steadily without removing his foot from the front lever. For attaching wooden templets points are provided on the fingers of the tension lever, and these by being pressed into the templet hold it securely. The tables are built with one single marking head, as shown, or with two heads, one located at each end. These tables weigh 900 lb. and can be easily transported about a shop. If desired, they can be mounted on rollers to facilitate shifting about.

Blast Furnace Gas.*

Determining the Quantity for a Given Output of Iron.

BY PROF. JOSEF VON EHRENWERTH, LEOBEN, AUSTRIA.

The increasing importance of the waste gases of the blast furnace as an economic factor in iron smelting, more particularly since their successful application in driving gas engines, makes it necessary that closer control should be exercised in their disposal, for which purpose an easy and ready means of determining the total quantity available at any time is eminently desirable. The following simple method of obtaining such a determination may be of interest. The data required are:

1. The weight of carbon contained in the gases corresponding to any particular unit weight of make—say, 100 kg.

2. An analysis of the gas expressing the constituents usually determined, in percentage volumes.

The first of these quantities, the carbon in the gases (C_g), corresponds to the total carbon (C_t) in the materials charged into the furnace—i. e., carbon in fuel—and that in carbon dioxide contained in limestone flux or uncalcined carbonate ores, diminished by the amount (C_1) absorbed in carburizing the metal, and that (C_2) in unconsumed fuel carried away by the gas and intercepted in the dust catcher, or

$$C_g = C_t - (C_1 + C_2).$$

The total volume of the gases may be computed from the heat balance sheet of the furnaces, where, however, they are expressed in weight, and no allowance is made for carbon in flue dust. The analysis of the gas should include determinations of carbonic acid, carbonic oxide, light and heavy hydrocarbons and nitrogen, together with hydrogen on account of its high specific volume, although the weight is usually unimportant. The calculation depends upon the simple proposition that the ratio of the volume of gas produced per unit of make to that of the analysis (100 volumes) is the same as that of the carbon contents of these quantities.

Supposing the analysis to show the constituents and their corresponding volumes to be

$$aCO_2 + bCO + cCH_4 + dC_2H_4 + eH + fN = 100,$$

the carbon contained per 100 c. m. in kilogrammes will be

$$\frac{3}{11} 1.978a + \frac{3}{7} 1.252b + \frac{3}{4} 0.559c + \frac{3}{7} 1.16d = C_g =$$

$$0.539a + 0.537b + 0.419c + 0.994d = C_g.$$

or, in round numbers,

$$C_g = 0.54 (a + b) + 0.42c + 1.00d.$$

The corresponding volumes of the different constituents per 100 units of make will then be found from the following proportions:

$$\text{For } CO_2 \text{ in c. m.}—C_g : C_g = xCO_2 : a \quad xCO_2 = \frac{C_g}{C_g} a,$$

$$\text{For } CO \text{ in c. m.}—C_g : C_g = xCO : b \quad xCO = \frac{C_g}{C_g} b.$$

and so on for the remaining constituents. Or, in general, Volume of gas in cubic meters per 100 units of output

$$= \frac{C_g}{C_g} (a + b + c + \dots)$$

of the volumes per cent. by analysis.

In the same manner the total quantity of gas is given by

$$G = \frac{C_g}{C_g} \times 100.$$

The results found by calculation are for the gas in the dried state, and require to be corrected for the water vapor derived from damp materials in the charge if necessary; and the volumes found are expressed at normal atmospheric pressure, and a temperature of 0 degree C. For any other pressure, b_1 , or temperature t , they become,

$$G_1 b_1 = G 0^{\circ}_{760\text{mm}} \times \frac{760}{b_1} (1 + \alpha t).$$

The calorific value per cubic meter at 0 degrees C. and 760 mm. is

* A paper read before the Iron and Steel Institute at Vienna, September 23, 1907.

$W = 30.63 CO + 86 CH_4 + 140 C_2H_4 + 26.2 H$ calories, the gas being supposed to be free from water.

The following example illustrates the use of the method: A blast furnace making white forge iron, with charcoal, from spathic ores (two-thirds calcined and one-third raw) consumed 74 kg. of fuel per 100 kg. of metal produced. What is the total volume of gas?

The charcoal contained: C, 85.1; CO_2 , 3.26; CO, 1.36; CH_4 , 0.7 per cent.; or carbon in 74 kg., $62.97 + 0.66 + 0.43 + 0.38 = 64.44$ Kg.
Carbon of CO_2 in raw ore..... 4.54
Total carbon in materials charged C_t 68.98
Carbon in metal..... 3.12
Total carbon in gases C_g 65.86

The gases contained

CO_2 , 15.3; CO, 25.6; CH_4 , 0.7; H, 1.3; N, 57.1 volumes per cent.; containing carbon $22.0 + 0.29 = 22.29$ kg.

$$C_g = \frac{65.86}{22.29} \times 100 = 295.47 \text{ c. m. per 100 kg., or } 2954.7$$

$$\text{c. m.} = (104.350 \text{ cu. ft.}) \text{ per ton.}$$

The calorific value is

$$30.63 \times 25.6 + 86 \times 0.7 + 26.2 \times 1.3 = 784 + 60.2 + 34.1 = 878 \text{ calories per cubic meter, or } 98.4 \text{ B.t.u. per cubic foot.}$$

The Lunkenheimer Air Nozzle.

It is not improbable that the example set by machine shops in substituting compressed air for chip and dirt brushes, prompted the adaptation of the same means by foundries in place of the usual hand bellows. In many



A Push Button Type of Air Hose Nozzle Made by the Lunkenheimer Company.

plants compressed air is now considered almost as indispensable as water, gas or electricity, and it has become common to provide for an equally extensive distribution of air in the laying out of the piping and wiring in new shops. Primarily compressed air is supplied because it is needed in productive operations, but since air compressors have attained a greatly increased efficiency it is no longer regarded as the luxury it used to be. Compressed air can now be had at relatively small expense, and it is natural that more uses have been found for it in commonplace purposes where it proves a convenience and time saver. One deterrent to its momentary use has been the labor involved in turning it on and off, and it is this objection that has been overcome with the push button type of air nozzles.

An improved air nozzle recently placed on the market by the Lunkenheimer Company, Cincinnati, Ohio, is illustrated herewith. The valve is easily handled and controlled, and the desired volume of air can be obtained by simply pressing the button on the top of the body. The shank is adapted to fit in a 1/2-in. pneumatic hose, and the internal construction is such that it should last indefinitely and always remain tight. The device will find its principal usefulness in foundries, machine shops, &c., where compressed air is already available. In foundries it is stated to give better results in the cleaning of molds and cores, and in machine shops it is an advantage to both tool and bench hands in the expeditious removal of filings and turnings from work.

Some splendid records for output are being made in the Bessemer steel plant of the Jones & Laughlin Steel Company, South Side, Pittsburgh. This plant contains three 10 ton converters, and in one week recently made 15,039 gross tons of ingots, the best record for a month being 62,655 tons of ingots.

The Walsh Inclinable Power Press.

A number of construction details which it is said have never been embodied in a machine of its type before, are to be found in the new open back inclinable power press made by the H. C. H. Walsh Company, 2448 West Kinzie street, Chicago, Ill., and illustrated in Fig. 1. Among these are the solid connection between the slide and crank shaft, the adjustment of the slide, the clutch and latch, the safety lock, the cushioned compression brake and the flywheel bearings. The new features have for their purpose the overcoming of the objectionable features found in other presses of this type. The machine is offered as one admirably adapted for stamping from various gauges of sheet metal.

The solid connection shown in the detail, Fig. 2, is self oiling, and has no jam nuts, such as would be likely to work loose, and no threads or holes. It has a solid ball seat with a positive take up for wear, and the adjustment for height of the slide is made in the top of the slide by means of a starting bar inserted in the holes in the screw head. The manner of locking the screw ad-

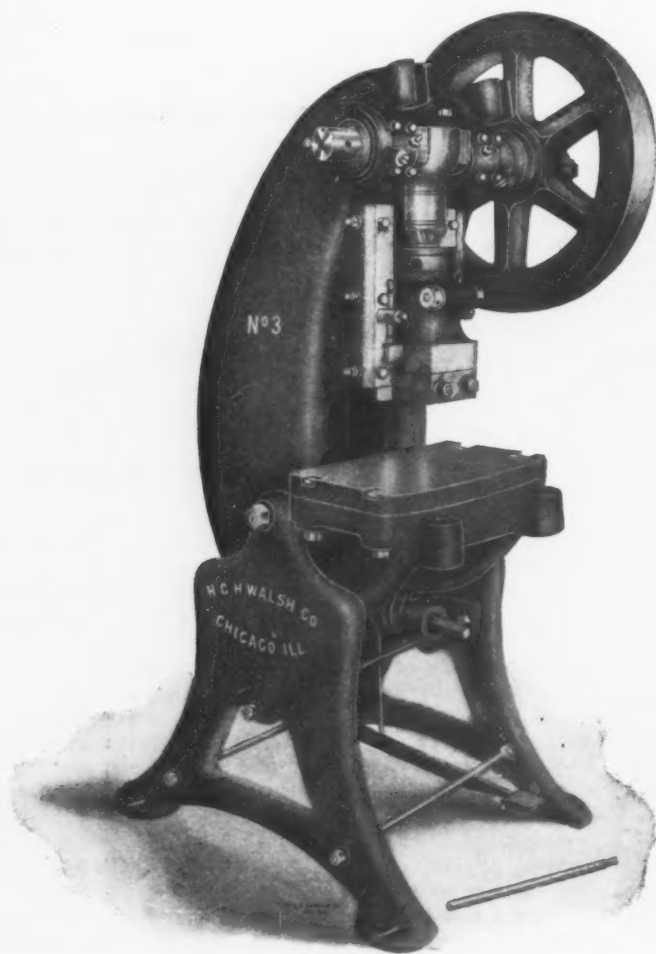


Fig. 1.—An Inclinable Open-Back Power Press Built by the H. C. H. Walsh Company, Chicago.

justment in the slide is also shown in Fig. 2, and is claimed to be the strongest and most positive ever put on a power press. In front of the adjusting screw is an eccentric stud which is locked in adjusted position by a round nut at one end. This stud comes in contact with a large brass plug, which is in contact with and fits the threads on the adjusting screw. By turning the eccentric stud with the starting bar until it binds the brass plug against the screw, the latter is locked in its adjustment in the slide, and then by tightening the nut on the end of the eccentric stud, this part is also clamped, making virtually a double lock. In testing this lock on a press as small as size No. 3, shown in Fig. 1, it is reported that after the parts were locked without special exertion, it was impossible to move the adjustment screw by striking the starting bar inserted in one of the holes

with a sledge. Not only did the screw fail to move, but the starting bar was badly bent. It would be apparent therefore that the jarring due to the meeting of the die and punch would hardly be sufficient to cause any alteration in the screw adjustment. The slide runs in V jibs, which are arranged to take up wear and keep it central at all times.

The knockout bar just below the eccentric stud is automatic, and is drawn back by a concealed spring on a stud, which travels in an opening in the center of the

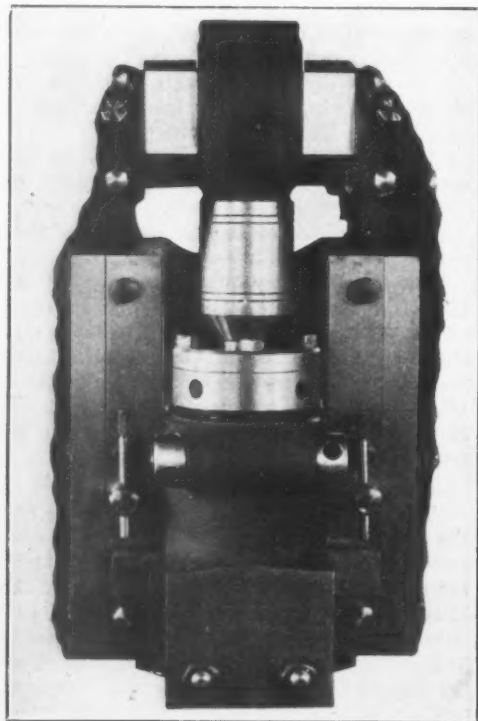


Fig. 2.—A Detail of the Solid Connection and Slide.



Fig. 3.—A Detail of the Cushioned Compression Brake.

slide, doing away with the spring and spring pockets found necessary in other presses on each side of this bar to keep it in position. In the top of the connection is cast an oil reservoir, which contains approximately $\frac{1}{4}$ pint of oil, and distributes it uniformly by capillary attraction through a wick oiler to the bearing on the crank shaft. The bearings of the latter in the frame of the press have similar oil pockets, the inlets to which are closed by the cap screws shown. The screw adjustment has an area four times as great, it is stated, as that on any other machine of similar size. The space left in the adjusting screw cap makes it necessary to file only the bottom in order to get a tight joint with the ball after it has become loose through wear.

The arresting of the upward movement of the slide and the avoiding of the shock on the latch and bolt is ac-

complished by the cushioned compression type of brake illustrated in Fig. 3, which once set maintains the same tension for a long time without attention. The brake is attached to the frame by a bolt passing through a slot in the yoke, allowing a slight backward and forward movement at this point. The friction member is a hinged shoe held in contact with the revolving drum by a short heavy compression spring in a barrel at the right. By setting up the screw at the extreme right the proper tension may be obtained and then locked with the jam nut shown, which causes the brake to maintain uniform tension for months, the heavy spring taking up whatever light wear may occur.

Fig. 4 shows the wheel end of the crank shaft and the clutch. The flywheel can be furnished with three clutching points, is bronze bushed and has a very long hub, to give a good bearing. The latter can be oiled from the end of the shaft while the wheel is running. The compression grease cup used in oiling the wheel has a locking device which prevents it from sticking or working loose. A small screw having a greater number of threads to the inch than the cap, passes through the latter and reaches to the bottom of the grease cup. After screwing up the grease cup until it has forced the necessary grease

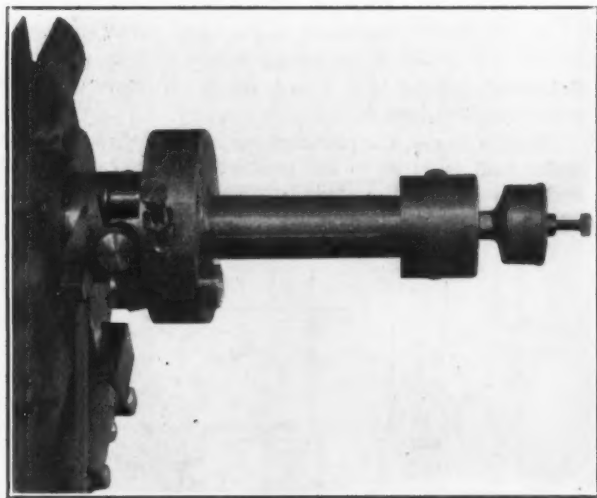


Fig. 4.—A Detail of the Wheel End of the Shaft and the Clutch.

to the wheel, tightening the small screw locks the grease cup cap positively, so that it cannot jar loose. To drive more grease through the bearings the small screw is loosened and the cap is screwed tighter.

To the left of the compression cup may be seen the collar, which holds the flywheel on its shaft. This collar is secured to the shaft by a dowel pin driven directly through it and the end of the shaft. This takes the place of the set screws which have heretofore been used and have been troublesome because they jar loose, making it necessary to keep a constant watch on this part. In the rim of the flange at the left, which abutts the other end of the flywheel hub, will be seen a bolt under spring compression which constitutes a safety device. A partial turn of this screw admits a pin which it carries to a slot in the surrounding collar, allowing the end of the bolt to enter a recess in the clutch bolt and hold it in retracted position. This allows the die setter to turn the shaft around by hand without removing the belt from the wheel.

The solid clutch bolt, which may be seen extending out through the right side of the flange, has no hole through it to contain a spring. The spring is carried in a spring barrel on the opposite side of the shaft flange, near the spring bolt referred to before, and through a bell crank lever tends to keep the clutch bolt extended. At the bottom of the spring pocket is a rubber cushion which, when the spring is compressed to its full extent, reduces the shock on the end of the plunger, which might be considerable if the brake became loose. The bell crank is a solid tool steel forging, and is pivoted on a projection fitting in a hole in the shaft. The pin shown

acts simply as a retaining pin to keep the bell crank from falling out, and is not subject to any working strain.

Above the spring barrel is a straight dowel driven entirely through the clutch collar and shaft. This retains the clutch mechanism in place, and when driven out makes it possible to remove all parts of the mechanism intact. It is to be noted that set and cap screws have been entirely done away with in holding any part of the clutch mechanism, eliminating the chance of anything jarring loose from the continuous concussions.

The solid square end latch shown to the left and beneath the bell crank lever, when released by the operator by taking his foot from the treadle, throws back and comes in contact with the clutch collar. When the bell crank, which is $\frac{3}{4}$ -in. thick at this point, comes in contact with the latch the clutch bolt is positively withdrawn, making it impossible for the machine to repeat. The mechanism of the clutch and latch affords little opportunity for wear on account of the very slight movement at the contact.

The main frame of the press is proportioned for strength and service and is supported on a base of similar character. A starting bar and socket wrench are all that are needed to incline the press, and no clamping parts are required. The presses are made in eight sizes, ranging in weight from 400 to 7000 lb., and in flywheel speeds from 175 rev. per min. for the smaller sizes to 90 for the two larger ones. The bed openings vary from 3 x 4 in. to 15 x 20 in., and the throat depths from $3\frac{1}{2}$ to 13 in. The standard strokes are from 1 to 3 in., and the maximum from $1\frac{1}{2}$ to 5 in. The larger sizes are provided with removable tie rods.

An Example of Smoke Prevention.

A Cleveland paper recently published the following letter written by W. R. Warner of the Warner & Swasey Company, Cleveland, to the smoke inspector of that city:

"I write to ask your suggestion in regard to a chimney which we built two years ago, which we have been using for the past year. I believe the general impression is that chimneys are used for the purpose of carrying away smoke, but this new one that we have been using for the past year does not seem to fill the bill in any sense, for it not only does not carry away smoke, but the bricks at the top even are nearly as clean and free from grime as when it was erected.

Should you happen to be out in this neighborhood I would be glad to have you call and give us any suggestions which your experience may lead you to offer looking toward the proper utilization of this chimney. The furnace under it is developing at least 350 hp. and the coal we are using is the cheapest kind of slack. We have, however, thus far been unable to make any smoke. Can you tell us what is the matter?

The Pickwickian vein of this letter has attracted attention to it, and Mr. Warner has been conducting an extensive correspondence. It turns out that no remarkable device is in use at his company's power plant, the boiler furnace being equipped with a chain grate. The explanation of the smokelessness of the Warner & Swasey Company's chimney is that it has provided ample grate surface and firebox, and that these and the chimney are of such size that there is no crowding. Were an attempt made to generate twice the amount of steam now produced perhaps the report would be different. After all that has been written about the best measures of smoke prevention in cities the old familiar fact remains that very much of the smoke emitted is due to the forcing of furnaces beyond anything for which they were intended. Patented devices are not a cure for economy in equipment.

At the annual meeting of the stockholders of the Crucible Steel Company of America, Pittsburgh, held in Jersey City, N. J., October 16, the following directors were elected: James H. Park, H. S. A. Stewart, Alexander Thomas, John A. Sutton, J. D. Lyon. Mr. Stewart succeeded Julius Bieler, resigned.

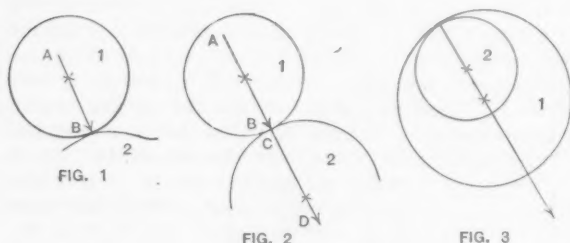
No. 3 Carrie Furnace of the Carnegie Steel Company at Rankin, Pa., which was blown out last month for relining and repairs, was in blast over six years on one lining, and in that time made 1,132,739 tons of iron.

Ball and Roller Bearings.—II.

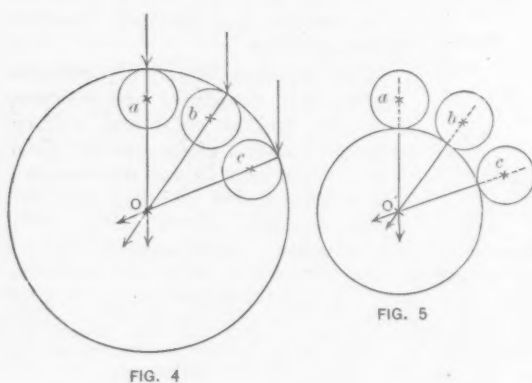
The Need of Separators to Reduce Friction.

BY J. F. SPRINGER, NEW YORK.

In the previous article the conclusion was reached that rolling separators are preferable in ball bearings, but that nonrolling separators are permissible in roller bearings if they also perform alignment service. However, the necessity or advisability of using separators at all to reduce the sliding friction arising from the mutual contact of the bearing balls or rollers, was shown to depend upon whether or not this friction occurs under considerable pressure. If the pressure is inappreciable the sliding friction is of no moment. The purpose of the present article is the practical determination of this question; not necessarily an exact determination, but an approximate one, sufficient to indicate whether it is well to sacrifice something in the way of load carrying ca-



Diagrams of the Direction of Pressure Through Bodies in Contact.



Analysis of the Load Transmission Through a Ball or Roller Bearing.

capacity to reduce friction, for the use of separators necessarily reduces the number of the bearing balls or rollers. (Hereinafter where the word "ball" is used it is to be understood as interchangeable with the word "roller," unless an exception is noted.)

There are two principal causes of circuit pressure—the compression of parts independent of their motions during operation and the compression resulting from their motion. The first is a problem in statics, to understand which it is necessary to remember that pressure is transmitted from a smooth circle to another smooth figure in the direction of a radius to the point of contact, as A B in Fig. 1. If the figure receiving pressure is also a circle, this pressure is transmitted along its radius to the point of contact, as C D in Fig. 2, and A B and C D coincide in direction. This principle still holds if one smooth circle contains the other, as in Fig. 3.

Applying this principle to a ball bearing, the pressure exerted by the outer ring upon a ball is transmitted along the line joining the center of the outer ring with the center of the ball. In Fig. 4 the load pressures are indicated in direction by the vertical lines and are transmitted through the balls *a*, *b*, *c*, in the directions indicated by the lines passing through O, the center of the outer ring. Likewise the pressures transmitted from the

balls to the inner ring are transmitted along the lines intersecting at O', the center of the inner ring, Fig. 5. If there is no compression the centers of the inner and outer rings coincide. Fig. 6 is a combination of Figs. 4 and 5, illustrating the directions of pressure transmission from the load to its support at the center of the inner bearing ring.

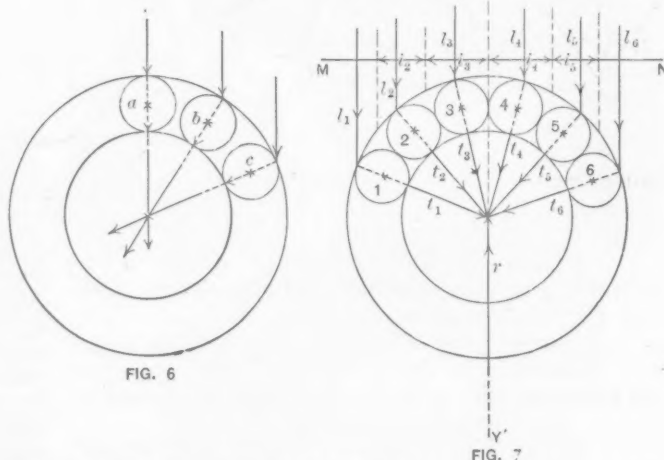
So far, merely the directions of transmission have been considered, and not their comparative amounts. In studying the latter it will be assumed, for the sake of simplicity and definiteness, that the distribution of the balls actually under load at the moment, is symmetrical with reference to a vertical axis Y Y', passing through O, Fig. 7, and that the load is evenly distributed over a line perpendicular to Y Y'. Then any pair of symmetrical disposed balls form together with the outer and inner rings, a system of four bodies in equilibrium. The total downward pressure delivered to a pair of symmetrical balls is balanced by an equal upward pressure (reaction) of the inner ring. If 2 and 5 be selected as the symmetrical balls, and *r* represents the reaction, then $l_2 + l_5 = r$. Or since, under the assumed conditions, $l_2 = l_5$, $2 \times l_2 = r$. Fig. 8 shows the parallelogram of forces in equilibrium, which is a rhombus, since $t_2 = t_5$, in accordance with the conditions assumed, therefore the diagonals bisect each other at right angles, and

$$\frac{1}{2} r = t_2 \cos \Phi_2, \text{ or}$$

$$t_2 = \frac{1}{2} r \sec \Phi_2.$$

Substituting l_2 for $\frac{1}{2} r$, $t_2 = l_2 \sec \Phi_2$; or, more generally expressed, $t = l \sec \Phi$.

That is to say, the pressure transmitted through a ball under load is equal to the product of the load imposed, and the secant of the angle between the vertical axis and



the line joining the center of the ball with the center of the shaft.

In considering the meaning of this formula, it is first to be noticed that the load *l* is variable, being a maximum at the vertical axis Y Y'. This is made clear in Fig. 7, where the vertical dotted lines midway between the vertical lines indicating the load may be considered to divide the portions of the load carried by the adjacent balls, and the intercepts made by the vertical dotted lines on the horizontal line M N, are proportional to the load delivered to the various balls. It is evident from this diagram that the load decreases the greater the distance to right or left of the vertical axis Y Y'. Similarly the sec Φ increases. Since the value of *t* is obtained by multiplying *l* by sec Φ . It is still a question whether *t* increases or decreases with the distance from Y Y'. This can be determined without involving much mathematics. In practice the value of Φ is limited to a relatively small angle, say 35 degrees, the load being negligible beyond the limits of such an angle. Assuming the load to be distributed over six balls, the arc between the contacts of successive balls with the outer ring would be 14 degrees. For the ball 4, $\Phi = 7$ degrees, and for the ball 5, $\Phi = 21$ degrees. Then

$$\frac{\sec \Phi_4}{\sec \Phi_5} = \frac{\sec 21^\circ}{\sec 7^\circ}, \text{ but } \frac{\sec 21^\circ}{\cos 7^\circ} = \frac{9925}{9336}$$

Of the intercepts on the horizontal line indicating the relative amounts of load delivered, let the intercept for the ball 4 be designated by i_4 and the radius of the contacting circle of the outer ring by R , then

$$i_4 = \frac{R \times \sin 21^\circ + R \times \sin 7^\circ}{2}$$

Likewise for the intercept corresponding to the ball 5,

$$i_5 = \frac{R \times \sin 21^\circ + R \times \sin 7^\circ}{2} \quad \text{and}$$

$$i_5 = \frac{R \times \sin 35^\circ - R \times \sin 7^\circ}{2}$$

$$\frac{i_5}{i_4} = \frac{R \times \sin 21^\circ + R \times \sin 7^\circ}{R \times \sin 21^\circ + R \times \sin 7^\circ} = \frac{\sin 35^\circ - \sin 7^\circ}{\sin 21^\circ + \sin 7^\circ} = \frac{5736 - 1219}{3584 + 1219} = \frac{4517}{4803}$$

As has been stated, the loads on the respective balls or rollers are proportional to the intercepts on the line

M N, Fig. 7. Therefore $\frac{l_5}{l_4} = \frac{i_5}{i_4}$ and substituting the now available numerical values to explain the relation between i_5 and i_4 :

$$\frac{l_5}{l_4} = \frac{l_5 \sec \Phi_5}{l_4 \sec \Phi_4} = \frac{4517}{4803} \times \frac{9925}{9336} = \frac{44831225}{44840808}$$

This shows that the load transmitted through the ball 5 is approximately equal to that transmitted through the ball 4.



FIG. 8

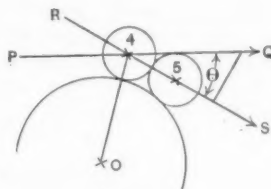


FIG. 10

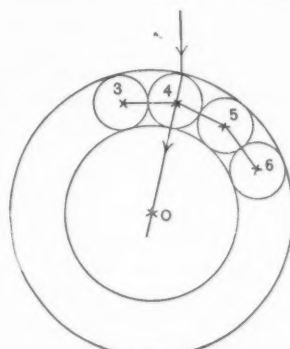


FIG. 9

Further Diagrams of Forces and Their Directions.

In like manner the conditions may be investigated for the ball 6, comparing it as before with the ball 4. The angle Φ is now 35 degrees, then

$$\frac{\sec \Phi_6}{\sec \Phi_4} = \frac{\sec 35^\circ}{\sec 7^\circ} = \frac{\cos 7^\circ}{\cos 35^\circ} = \frac{9925}{8192}$$

The horizontal intercept is i_6 and is equal to

$$\frac{R \times \sin 49^\circ - R \times \sin 21^\circ}{2}$$

therefore

$$\frac{i_6}{i_4} = \frac{R \times \sin 49^\circ - R \times \sin 21^\circ}{R \times \sin 21^\circ + R \times \sin 7^\circ} = \frac{\sin 49^\circ - \sin 21^\circ}{\sin 21^\circ + \sin 7^\circ} = \frac{7547 - 3584}{3584 + 1219} = \frac{3963}{4803}$$

Again substituting numerical values,

$$\frac{l_6}{l_4} = \frac{l_6 \sec \Phi_6}{l_4 \sec \Phi_4} = \frac{3963}{4803} \times \frac{9925}{8192} = \frac{39332775}{39346176}$$

This shows that the load transmitted through the ball 6 is, as before, something less than the load transmitted through the ball 4. The important fact developed by this investigation is that, while there is some decrease in the load transmitted through the balls, the greater their distance from the vertical axis Y Y', it is not considerable.

The inquiry so far has ignored compression at the points of contact of balls with the contacting bearing rings. Each ball is compressed at two points, and each bearing ring at a single point. The sum of these compressions acts to separate the centers of the outer and inner rings in the direction of the delivery of the load to the bearing. These considerations also point to the conclusion that the vertical axis Y Y' marks the position of maximum load on the balls. And not only is it greatest here, but because of the enormous increase of elastic resistance as compression progresses, it is evident that

there is a rapid increase in pressure as the axis Y Y' is approached.

Aside from compression, as has been shown, the stresses transmitted through the various balls participating for the instant in the load are approximately equal; therefore a ball in passing through the zone of load experiences little or no variation in the load transmitted through it apart from compression, since the contrary effects of the diminishing load intercepts and the increasing angles of pressure transmission through the balls, practically nullify each other. This leaves compression as the only factor responsible for any increase or decrease in pressure through load balls in different positions. It is known that there is a rapid decrease of pressure transmitted through the balls the more remote they are from the vertical axis and therefore this is due to compression.

Before passing on to the direct consideration of circuit pressure it should be remarked that the balls and the contacting bearing surfaces, which have so far been regarded as perfectly smooth are not, strictly speaking. Even although they may be ground, polished and lubricated, there still remains a roughness, invisible to the eye, which, when combined with the indentations arising from compression, produces a viselike gripping of the balls between the bearing rings. The amount of this varies with the degree of smoothness and the susceptibility to compression. In any single bearing it is assumed that the smoothness is the same throughout, but, as already explained, there is great variation in compression.

With this there is a corresponding variation in the amount of grip with which the balls are held. They may be held with a very considerable degree of firmness at or very near the vertical axis, but to either side of it this grip very rapidly diminishes.

The question of circuit pressure arising from roughness and compression will first be considered without respect to motion of the parts.* Only a few of the balls in a journal bearing are actually under load at a given instant. One-fifth of the whole would,

perhaps, be a fair estimate. With motion for the time disregarded, the circuit pressure to which a ball on one side can be subjected is limited by its own resistance to bodily displacement, due to the grip of the raceways and the resistances of the other balls, at that moment under the influence of the grip. The aggregate effect depends upon the number of balls subject to this grip and the amounts of the grip itself. In Fig. 7, where the number of balls under load is assumed to be six, the ball 4 can be subject to no greater pressure on its right side than the combined effect of the grip with which it and balls 1, 2 and 3 are held by the raceways.

Why roughness and compression produce circuit pressure may be understood from Fig. 9. The load delivered vertically passes through ball 4 in the direction of O, resulting in a very small movement because of deformation under pressure, and, as balls 3 and 5 are undergoing similar experiences, their crowding together sets up circuit pressures passing from the center of ball 4 toward the centers of balls 3 and 5. But as before observed, the circuit resistances or grips limit the amount of this circuit pressure. It may be taken for granted that circuit pressure is greatest at the vertical axis Y Y', Fig. 7, because here the pressures through the balls which give rise to the circuit pressures are greatest and the accumulated resistances or grips amount to more.

From the foregoing it is justifiable to conclude that very considerable circuit pressures arise from roughness and compression, apart from motion of the bearing, and especially at and near the vertical axis. As these pressures depend largely upon the compressibility of the

* It may be well, for the sake of completeness, to refer to a possible source of circuit pressure, apart from roughness, compression or motion. A row of balls having no play in circuit would, upon being subjected to pressure from the outside, set up circuit pressure. This is so easily overcome by the simple expedient of allowing a slight play in circuit that it seems hardly necessary to burden the text with it.

parts, they may be minimized by selecting steels for the rings and balls having the greatest possible hardness and deformation resisting power.

Next to be considered is the circuit pressure, due to compression created by motion of the parts when the bearing is in operation. It was mentioned before that the centers of the outer and inner rings are not in coincidence, because of compression. Assuming for convenience that the inner ring is quiescent and the outer ring is the driving member, then when the bearing is in operation the external raceway is turning on a center below that of the inner one. The velocity of a point in this outer ring depends upon its distance from this lower center. As the outer raceway is variously compressed at different points, due to the varying pressures already considered, the points of contact of the outer ring with the balls are at varying distances from the center of rotation, and each shifting point of contact undergoes varying velocities, being greatest at the point of greatest compression and least at the point of least compression, because these points are at the greatest and least distances from the center of rotation. The orbital velocity of a ball is one-half the velocity of the driving surface at the point of contact, and varies proportionately with the latter velocity, so that while a ball passes under the load its orbital velocity is accelerated until it is in the middle of the load zone, and from then on it is retarded. It follows that through one-half or more of the load zone, the balls are overtaking each other. Any particular one overtaking the one just ahead has an excess of velocity equal to the difference between their orbital velocities at the instant of impact, but this is not the velocity of the actual impact, for the impacting body is moving at the instant of collision in a direction at an angle with the line of centers in which the impact is actually felt. To obtain the velocity of actual impact it is necessary to multiply the differential velocity by the cosine of the angle included between the two directions. This is illustrated in Fig. 10, where P Q represents the line of advance of the impacting body 4, while R S gives the direction of the velocity of actual impact. Representing the differential velocity by d , the result of the collision between 4 and 5 is the same as if 5 were at rest and were collided with by 4 moving in the direction R S with a velocity equal to $d \cos \theta$. As the cosine of even the smallest angle is less than unity, the velocity of actual impact is less than the differential velocity. The seriousness of the impact depends upon the weights of the colliding bodies, which may be estimated by determining the pressures on the two balls in a direction perpendicular to the line of centers. It should be borne in mind, too, that the resistances of 4 and 5 are considerably increased by the grip with which they are held by the raceways. It appears, then, that there is here a very considerable source of circuit pressure, and although it is doubtless increased by the grip of the raceways, it would exist independently of the latter on account of compression varying the orbital velocity.

The main conclusions to be drawn are that there are two considerable sources of circuit pressure between balls. The sliding of these members against each other in a bearing is, therefore, not a matter of indifference; the friction is decidedly of sufficient importance to warrant separating devices. With this premise it is well to review the conclusions of Part I of this article, which were as follows: In ball bearings, as distinguished from roller bearings, apparently the only advisable type of separator is one that rolls or rotates between the bearing balls; a nonrolling separator is of doubtful utility as a friction reducer; a rolling separator should be supported, so that its center will lie in a line joining the centers of the adjacent bearing balls, making such sliding friction as exists between the separator ball or roller and the holding device negligible because of being under inappreciable pressure; and in roller bearings, as distinguished from ball bearings, the objection to a non-rolling separator is largely offset when it performs the additional and necessary office of maintaining the alignment of the rollers, but if a rolling separator is used the same principles apply with regard to its support as in ball bearings.

(Concluded.)

The Westinghouse Foundries.

The report in the daily press that the several Westinghouse companies are about to consolidate their foundry operations at Trafford City, Pa., is simply the revival of the discussions which have been going on during the past few years concerning the advantages of such an arrangement when the demands for apparatus outgrow the present capacity of the Westinghouse foundries at Trafford City and Allegheny, Pa., and Cleveland, Ohio. In the works of the Westinghouse Electric & Mfg. Company, Westinghouse Air Brake Company, Westinghouse Machine Company and Union Switch & Signal Company important changes have during the past year and a half been going on in departmentalizing the several classes of manufacture, the effect of which by reason of a better supervision will be to reduce greatly the active working capital by cutting down the quantity of material carried in the various stages of manufacturing.

One of the beneficial results of the departmentalizing of the several manufacturing operations and a constant interchange of views has been to engender a feeling of excellent rivalry between the managers and the rank and file of the several companies, each set of officials being determined to make the best showing in annual sales of material, work in progress and completed goods carried in warehouses, which means not only a very large saving in investment, but also the freeing of valuable space for actual manufacturing operations. By the use of improved tools and methods the time needed to turn out apparatus for a given order has already been reduced in some cases to less than one-third of that formerly required; that is to say, generators, motors and many other devices formerly requiring several months from the receipt of the order to shipment are now manufactured and shipped in one-third of this time.

The Westinghouse managers, from the highest to the lowest, are keenly alive to the fact that in the near future the demand for the product of the several companies will be greater than ever before, and the betterment which can now be effected will greatly increase the output capacity of the works of the several companies without any material additions to machinery. As a matter of fact, there is no foundation whatever for the specific statement made that a large amount of building operations is to be undertaken in the near future.

The Census Bureau has just published statistics of the 154 cities in the United States, having more than 30,000 population in 1905. New York, with 4,000,000 population, had been adding to its total in the three years preceding 1905 at the rate of 100,000 a year. Philadelphia, with a little less than 1,500,000 population had increased at the rate of 30,000 a year. The cost of municipal government in New York was \$164,493,177 in 1905; in Philadelphia, with three-eighths of New York's population, the cost was \$32,535,074, or less than one-fifth; Chicago, with half the population of New York, expended \$41,700,752, and Boston, \$28,000,000. The debt of New York in 1905 was \$647,806,295; that of Boston, \$99,191,856; of Philadelphia, \$69,600,295; of Chicago, \$69,950,640.

The National Foundry Company, Erie, Pa., manufacturer of open hearth steel and gray iron castings, has had its steel plant in operation for more than eight months and is producing an exceptionally fine quality of castings. The company recently completed a large order for machinery steel castings for use in the new plant of the Indiana Steel Company, Gary, Ind., and has filled large orders for steel castings for various shipbuilding concerns. It is also giving attention to railroad steel castings.

On October 1 the 42-in. universal mill at the plant of the Youngstown Sheet & Tube Company, Youngstown, Ohio, made 479 gross tons of steel on the day turn, and 529 tons on the night turn of the same day, or a total of 1008 tons of steel in the 22 hr. of work on both turns.

Railroad Rate Injunctions.

BY R. L. ARDREY.

One of the most important recent developments in transportation affairs is the success that shipping interests have met with in appealing to the courts to prevent advances in rates. In every case thus far where shippers have brought suit in the Federal courts they have been granted temporary restraining orders to enjoin the railroads from putting advances in rates into effect. While none of these recent cases has come to a square issue in the final hearing for a permanent injunction, the shippers have won their contentions as far as they have gone, and they will at least have the satisfaction of having their grievances reviewed by impartial tribunals. Very important is the fact that shippers also gain time in which to adjust their business to the proposed advances in freight cost, in the event of the courts deciding in favor of the carriers.

No suit of this kind has been brought in the courts as yet by iron or steel interests, but it is understood that several are contemplated. The most important cases thus far have been a suit at Pittsburgh by brick manufacturers to restrain an advance in brick rates; one at Chicago against the Western trunk lines, brought by Western creameries on cream rates, and a case at Sioux Falls by the jobbing and merchant interests of that city to restrain new rates which they alleged would discriminate against them. The Sioux Falls case is the only one that has come to a final hearing. It was dismissed because the carriers abandoned their intention to make the advance, but the court held that it had jurisdiction, and intimated that it would have granted the complainants' relief had it been necessary.

The Foundation for This Procedure.

The Tift case, involving rates on Southern lumber, which was decided by the United States Supreme Court last spring, laid the foundation for this procedure in contesting advances in rates. The Southern railroads had made an advance of two cents per 100 lb. in their rates from the mills to the Ohio River. The lumbermen obtained a hearing before the Interstate Commerce Commission, which declared the increase in rates unreasonable, but as this occurred before the passage of the Hepburn act the commission had no power to enforce its decision. The lumber interests, however, took the case before the Federal courts, and on appeal the Supreme Court decided against the carriers and ordered them to refund to lumber shippers the advance which had been collected while the case was pending.

The Supreme Court dismissed with impatience one of the claims of the railroads—that the price of lumber had advanced and the lumber business had become more profitable, so that shippers or consignees could afford to pay a higher rate. The law was laid down, with considerable emphasis, that the carrier has no right to demand more of the shipper's money merely because he has prospered in business. The court also laid down the doctrine that it is unlawful for competing railroads to agree on an advance in rates and put it into effect by agreement or by concerted action. In all the new cases that have been brought to restrain advances in rates the complainants are careful to show that the proposed advances will overturn established business conditions, which have become adjusted to the old or present basis of rates, and that the complainants will suffer irreparable loss in their business.

The Tift Decision Safeguards Those Having Contracts.

If the Tift decision had been handed down by the Supreme Court a few months earlier it might have been followed by the Northern foundry interests in contesting the advance in the rates on Southern pig iron which went into effect last winter, and the advance of half a class in iron and steel rates in official classification territory might have been stopped by similar procedure. The Tift decision was fully as important an event, from the standpoint of the shipper, as the passage of the Hepburn act, as it will safeguard any industry against an unjust advance in rates, and, even if an increase is reasonable, the

courts would undoubtedly be disposed to hold it back until the industries affected by it have completed contracts which they entered into before the advance was announced.

The Interstate Commerce Commission has been overwhelmed with complaints since the passage of the Hepburn act, and it is estimated that complaints that are filed now are not likely to receive a formal hearing for six to nine months in the ordinary course of procedure, and may not be finally disposed of by the commission for two years. It is, of course, useless for a shipper to appeal to the commission against an advance in rates which is to take effect in 30 or 60 days, if the complaint cannot be heard for six months, and it is not likely that the commission can do any better in future years, as new cases are accumulating on its docket more rapidly than old or pending cases are disposed of. In cases of unusual importance affecting a large number of shippers or a large volume of business, the commission may give a prompt hearing out of the regular turn, but this will cause further delay and congestion of the ordinary cases on the docket. Now, however, the shipper can get an injunction without serious difficulty to restrain an advance until after the commission has given a hearing and decided what should be the lawful rate, and if the decision of the commission is not satisfactory the shipper can again appeal to the courts for relief.

Sharp Advances in Rates Can Now Be Checked.

To the railroads this new development has proved disconcerting, to say the least, as it places in the hands of the shipping interests the means of checking any important advance in rates which the carriers may contemplate. In the future they must wait for the volume of traffic to grow, rather than to increase their earnings by marking up their rates. Even the courts have changed their attitude toward the carriers on rate questions. A few years ago the railroads advanced their rates on packing house products under cover of an attack on the packing industry, and then went into court and obtained an injunction against themselves to restrain themselves from cutting the rates which they had agreed upon among themselves. While the higher courts did not sustain this remarkable procedure, the trend of decisions on rate questions had long been in their favor.

The railroads, however, have the consolation that their gross earnings from operation have increased about half a billion dollars in the past three years, making a gain of 25 per cent. in the face of agitation, legislation and all the ills they have had to contend against. Since the Elkins law was enacted, five years ago, their gross earnings from operation have increased nearly a billion dollars, a gain of more than 50 per cent. There has been but little increase in the tonnage production of agriculture in that time, and there are few manufacturing industries that have made a gain of 50 per cent. in their gross receipts in the past five years. In 1906, as shown by Poor's *Manual*, the net earnings of the railroads from operation amounted to \$3580 per mile, or 5 per cent. on the aggregate of stocks and bonds. Eliminating the stocks and bonds owned by other railroads, and taking only those owned by the public, the net earnings were 8 per cent. It goes far to show the underlying strength of business conditions when the railroads have been able to maintain their position so well in the face of a flood of adverse legislation and agitation.

In an industrial edition of the Youngstown, Ohio, *Telegram* figures are given showing the tonnage of the Mahoning Valley, as compiled by local railroad officers. It is estimated that for 1907 the total railroad tonnage in and out of the Mahoning Valley, from Niles to Lowellville and including both the latter places, will exceed 22,000,000 tons. The inbound tonnage is distributed as follows: Iron ore, 5,000,000 tons; coke, 3,500,000 tons; limestone, 2,200,000 tons; coal, 3,500,000 tons; other raw material and merchandise, 3,800,000 tons. The outbound freight, representing the products of the mills, furnaces, cement, brick and other plants and general merchandise, is put at 4,250,000 tons. In 1897, the tonnage was 8,000,000 tons, so that the gain in 10 years is about 175 per cent.

A Weber Gas-Power Pumping Plant.

For operating the water and light plant of Rockyford, Colo., there has been installed an equipment extremely novel for its kind that has much to commend it. The

1000 gal per minute at 100 lb. pressure. There is also operated by friction drive from the shaft a 5-kw. generator used for lighting the plant. One engine and producer are sufficient for driving all of the machinery under ordinary conditions, so that the other engine and producer form a reserve in time of special demand, such as the occurrence of a fire or an accident.

These engines and producers were installed by the manufacturer under a guarantee to consume not more than $1\frac{1}{4}$ lb. of Colorado anthracite, which is rather an inferior grade of hard coal. The plant is now operat-

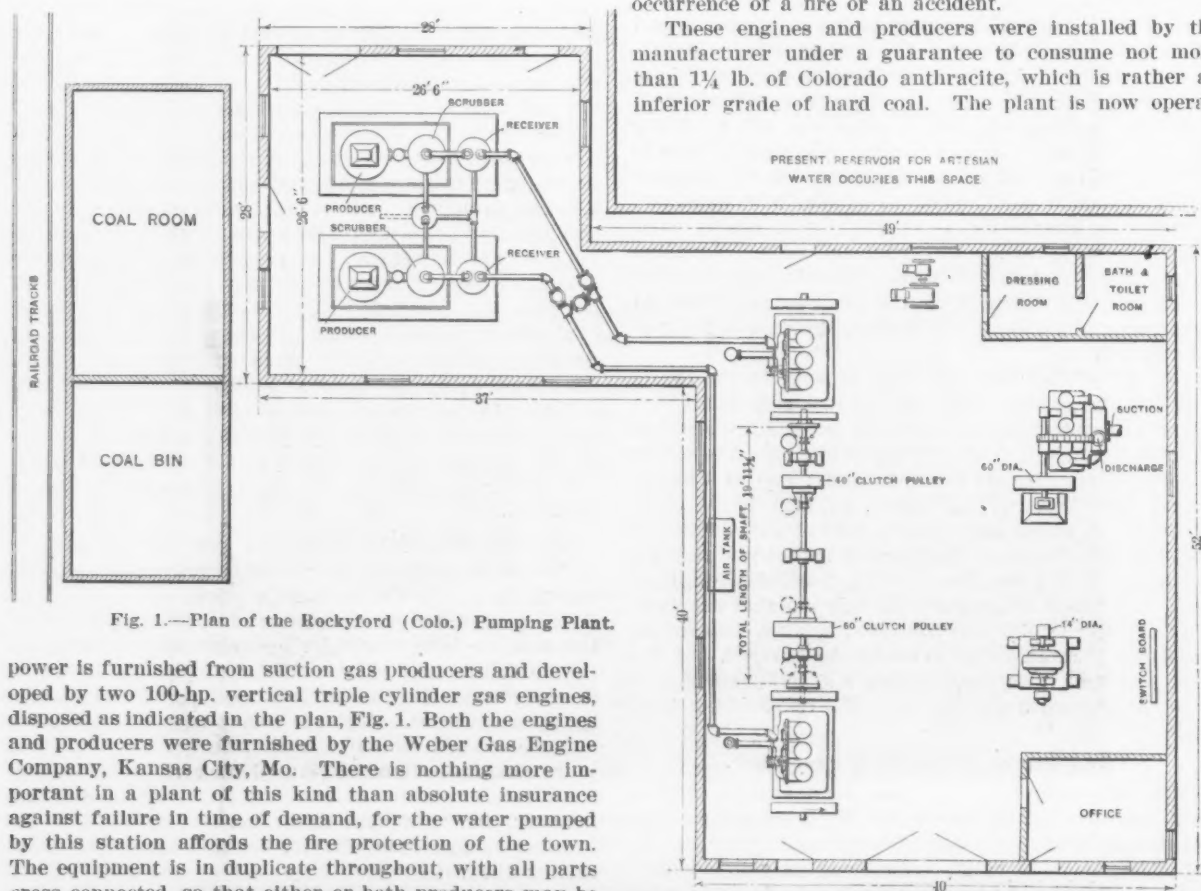


Fig. 1.—Plan of the Rockyford (Colo.) Pumping Plant.

power is furnished from suction gas producers and developed by two 100-hp. vertical triple cylinder gas engines, disposed as indicated in the plan, Fig. 1. Both the engines and producers were furnished by the Weber Gas Engine Company, Kansas City, Mo. There is nothing more important in a plant of this kind than absolute insurance against failure in time of demand, for the water pumped by this station affords the fire protection of the town. The equipment is in duplicate throughout, with all parts cross connected, so that either or both producers may be

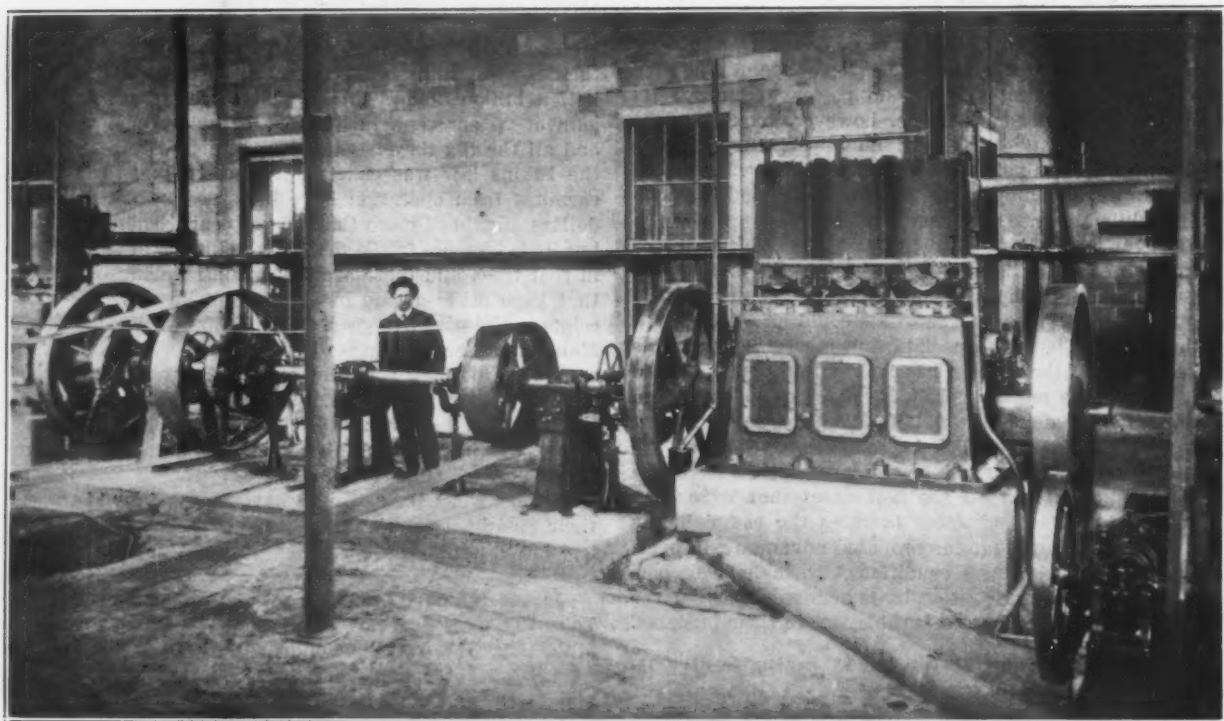


Fig. 2.—The Weber Gas Engines and Line Shaft, with Its Clutches and Pulleys.

used to run either or both engines. The engines, as indicated in the plan, Fig. 1, and also in the half-tone engraving, Fig. 2, are directly connected by clutches to the opposite ends of a shaft, carrying pulleys for driving a 65-kw. Bullock alternating current, 220-volt alternating current generator, with a direct connected exciter, and a 12 x 14 in. Dean triplex power pump, with a capacity of

ing on 1 lb. per horsepower hour. The gas producers are located about 90 ft. from the engines in a somewhat isolated room, an interior view in which is given in Fig. 3. Fig. 4 shows the lighting generator, with its direct connected exciter and the triplex power pump.

A 5-hp. gasoline engine direct connected to an air compressor is used in starting the main engines with

compressed air. The same gasoline engine is connected to an exhauster, and while the compressor is getting up air pressure the exhauster is building up the fire in the producer, so that as soon as the air pressure is sufficient to start the engine the gas producers are furnishing

driving the generator and pump and the latter delivering water at 40 lb. pressure, a fire alarm was received and immediately the pressure was raised from 40 to 100 lb. It has been found possible to transfer the load from one engine to the other within 5 min., and to make

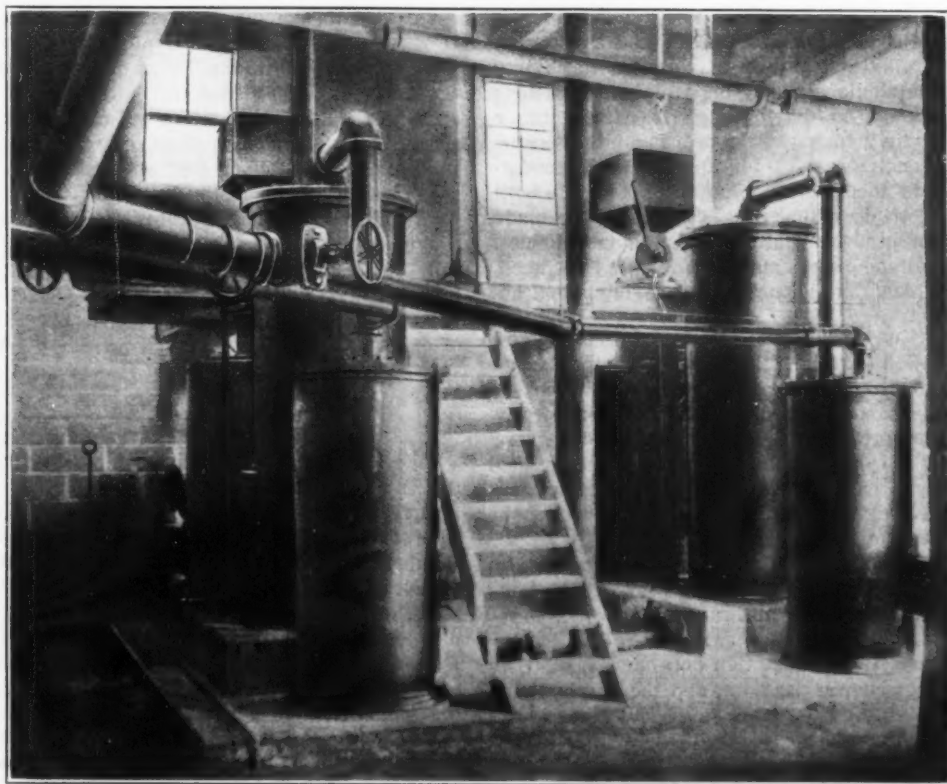


Fig. 3.—The Two Weber Suction Gas Producers in the Rockford Pumping Plant.

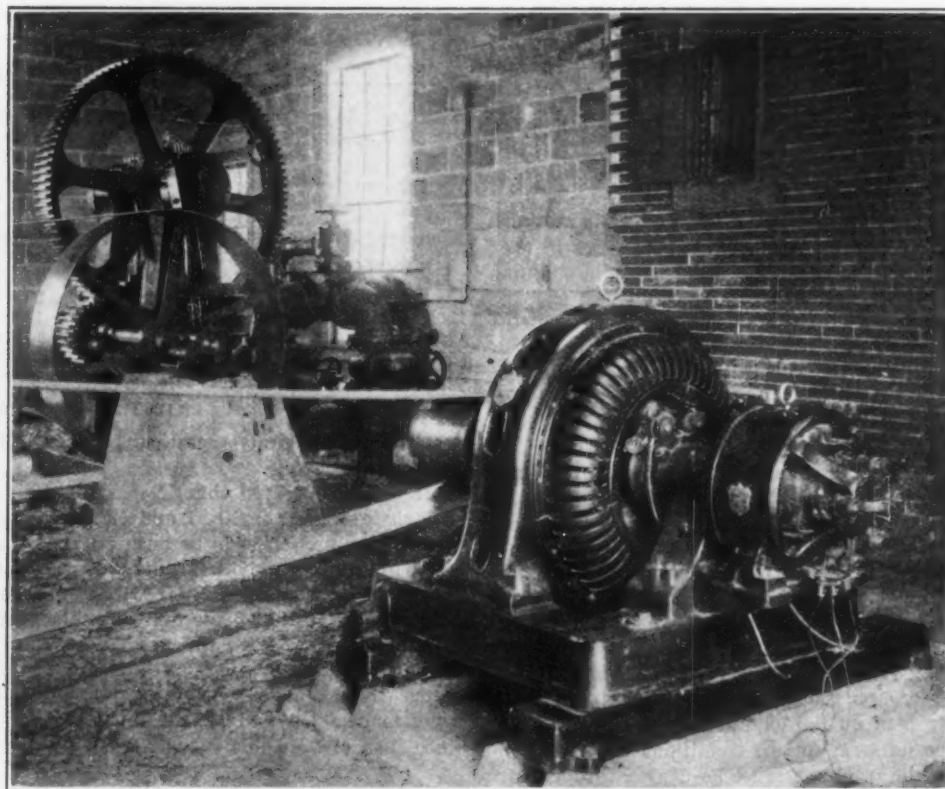


Fig. 4.—The Bullock Alternator and Dean Triplex Power Pump Driven by the Two Belts Which May Be Seen in Fig. 2.

sufficient gas to allow the engine to take up its normal operation. Both of the engines have been repeatedly tested under varying conditions and, it is claimed, show a speed variation of less than 2 per cent. from no load to full load. One of the most severe tests to which the plant has been subjected occurred while one engine was

the change with a speed variation of less than 2 per cent. It is estimated by the officials in charge that the plant will pay for itself within four years merely in the saving of fuel.

Concerning this power plant it may be interesting to give more in detail concerning the engines and producers.

The engines are of four-cycle single-acting type and are principally remarkable for their compact self-contained design, which permits automatic lubrication, the housing of the working parts and low cost of maintenance and attendance. The compactness is largely due to their being of vertical pattern, but for this reason they are also claimed to have the advantages of low frictional losses and greater facility of removing valves and the piston. Emphasis is also laid on the lack of vibration in engines of the four-cycle single acting type, which makes them particularly suitable to driving electric generators or other apparatus in which close speed regulation is desirable. These engines are of 100 hp., but the manufacturer also builds them in sizes up to 400 hp. in both the double and triple cylinder styles. They are made for operating on producer, natural or illuminating gas, gasoline, or distillate. Particular attention, it is claimed, has been paid to making all parts durable, simple and accessible.

The air starting device is automatic in action and simple in operation. Pulling the air lever handle so as to drop the valve stem on the cam and opening the cock on the pipe leading to the gas storage tank automatically admits air under pressure of 100 to 250 lb. per square inch to one of the cylinders and keeps the engine in motion until the gas entering the other cylinders is compressed and fired and the regular cycle of operations is established, when the air is cut off.

The Weber suction gas producer is automatic in operation, self contained and has no moving parts, regulators, filters or purifiers. It burns anthracite coal, coke, charcoal, lignite and some refuse materials. With some fuels, it is claimed, the consumption does not exceed 7-10 of a pound per horsepower per hour, and the cost is sometimes less than 2-10 of a cent per horsepower per hour. Instead of filtering the tar from the gas, the Weber producer burns it, saving energy which would otherwise be wasted. There is no danger of burning the grate, owing to the fact that these are automatically kept cool and moist. The automatic generation of a light vapor or steam to supply hydrogen to the gas, as required by the load on the engine, is an important feature of the engine. The producers are built in sizes of from 10 to 500 hp. in single units and in multiple units to meet any requirements.

The fuel feeding valve between the hopper and magazine makes the producer airtight at this point, irrespective of the position of the valve. The valve can be arranged to feed automatically and continuously, as its motion is rotative and it is impossible to overcharge the producer. The body of the fire rests on the ashes in the ashpan, below which is a two part sliding grate having an opening for the admission of air to the fuel bed, and in addition air is admitted at the side between the ashpan and the outer wall of the producer proper. A large space between the pan and fire ring allows easy removal of ashes and clinkers, and if a clinker is formed too large to be brought over the outer edge of the ashpan the two halves of the grate can be separated with a stoke bar to drop it through. The fire ring is in sections and being of small diameter at the bottom a slash bar can be passed through holes in the top of the producer and pushed down the side of the fire brick lining, and as soon as the bar strikes the angle of the fire ring it will be forced toward the center of the fire effectually loosening and breaking up the fire to permit the most efficient formation of gas. The steam generation is automatic and requires no moving regulator, being controlled entirely by the degree of heat and the quantity of gas generated as required by the load on the engine. The quality of the gas is therefore uniform for all conditions of load. All air admitted to the producer must be drawn through air holes communicating with the upper boiler and in passing over this body of boiling water the air is superheated and carries with it sufficient steam for the production of hydrogen gas. Leaving the upper boiler the mixture of superheated air and steam passes down through a channel between the fire brick lining and the other shell of the producer and enters the producer proper at a point slightly above the ashpan and grate; thence it passes on up through the incandescent fuel bed. The air and steam

entering as they do at this point precipitate enough moisture on the grate to prevent its warping or burning. The quantity of air admitted and consequently the amount of steam drawn over depends entirely upon the strength of the suction effort of the engine.

The scrubber is designed to allow free movement of the gas, at the same time effectually cleaning and cooling it thoroughly. The method of spraying water upward and outward from the ball type of nozzle used distributes the water uniformly over the entire area of the scrubber and the gas after leaving the bed of filtering coke is then passed through a clean sheet of water before it is admitted to the receiver and engine. The nozzle of the spray valve can be instantly cleaned of any obstruction by turning it one-half revolution. The same operation provides a larger area of outlet around the valve to permit the flushing of the scrubber washing away any impurities that may have adhered to the coke filter. In this way it is possible to obtain clean gas with the use of only one scrubber.

Pig Iron Prices from 1890 to 1906.

We have secured from one of the leading stove companies a tabulated statement of the prices it paid for pig iron from 1890 to 1906, which is exceedingly interesting. This company generally makes its purchases of pig iron in October of each year for the next year's consumption. The foundry is located at a point carrying a freight rate of something over \$3 per ton from the Birmingham District of Alabama. The prices named are for delivery at the foundry through the year following. Thus, the prices named for 1890 represent the cost to the foundry of the pig iron delivered in 1891; the prices named for 1906 represent the cost to the foundry of the pig iron delivered in 1907. The only exception to this procedure was in 1902, as explained below. The table is as follows:

Comparison of Pig Iron Prices, 1890 to 1906.

	Southern foundry.			Soft, 6 % silicon, No. 1.	Strong foundry, No. 1.
	No. 1.	No. 2.	No. 4.		
1890.....	\$16.50	\$15.25	....	\$16.00	....
1891.....	15.25	14.25	....	16.00	....
1892.....	13.25	12.50	....	16.00	....
1893.....	13.35	12.85	....	12.00	....
1894.....	10.00	10.00	....	11.00	....
1895.....	10.00	10.00	....	11.50	....
1896.....	11.90	11.90	....	11.85	....
1897.....	10.50	10.50	....	11.50	....
1898.....	10.00	10.00	\$9.25	10.50	....
1899.....	16.30	15.80	13.65	17.85	....
1900.....	14.75	14.25	13.25	16.50	\$15.00
1901.....	14.25	13.75	13.00	14.25	14.75
1902*.....	15.80	15.80	14.80	17.25	18.00
1902†.....	20.80	20.80	19.80	25.50	23.00
1903.....	13.00	13.00	12.00	14.20	12.40
1904.....	13.25	13.25	12.25	15.60	15.00
1905.....	16.80	16.80	15.90	12.45	17.50
1906.....	17.95	17.95	16.95	19.70	17.65

* Purchases for delivery in 1902 were deferred until February of that year.

† This line represents August purchases for delivery over the remainder of 1902.

It will be observed that in most of the years covered the prices secured on No. 1 and No. 2 Southern Foundry were the same. This is because purchases are made in equal quantities of both grades and they are then furnished at the same price. It will also be seen that the prices secured in 1906 for delivery this year were quite low, as compared with the figures quoted from week to week; in fact, present quotations are about \$5 per ton higher than the price paid in 1906 for deliveries now being made. Up to 1900 the ton consisted of 2268 lb.; since then of 2240 lb.

H. A. Johnson, British Consul at Liege, Belgium, reports that experiments are being conducted on the Belgian Government railroads, with a view to using a heavier rail. The weight of locomotives has increased from 40 and 45 tons to 80 and 90 tons, and the heaviest rails now laid weigh 82 lb. per yard. It is proposed to substitute for them rails weighing 114 lb. per yard. If the heavier rails are found satisfactory they will be used quite generally.

The Decline in Pig Tin.

The price of tin for the past week has hovered around the low level of 31 cents per pound, following a sensational and precipitous decline, in which the price has dropped from above 40 cents to around 30 cents. This came with little warning, although it was felt that the price was too high to continue for any length of time. On May 1, 1906, the price of tin was forced to 40 cents for the first time since the boom of 1888. In that month tin was sold as high as 49 cents, being the highest price ever recorded. Although this boom was short lived, the price continued above 37 cents until the third week in September, 1907, or the starting of the last serious decline. After the climax in speculative enthusiasm in May, 1906, following which the price declined to around 40 cents, the market exhibited unusual steadiness considering its former erratic tendencies, and for nearly 18 months the fluctuations were of a comparatively minor character. Credit for this steadiness has been given to a subsidiary company of the United States Steel Corporation through its operations both in London and in New York, selling its stocks on hand even at a loss when the market was squeezed and buying in large quantities on the declines. The aim of this company was to secure its tin as cheaply as possible.

Causes Assigned for the Break.

The recent break of this month has been variously ascribed to selling by Oriental producers and sales for London account, while other theories are advanced, one being that a powerful bear clique in London, having been successful in its operations in copper, has now turned a part of its attention to bringing about a decline in tin. This, combined with a world wide financial unrest and a falling off in consumption, is probably back of the decline. It is difficult at this early moment to trace or measure the extent of the decline in consumption; sufficient to say that the statistics compiled do not show its full extent. The paramount reason for the erratic course of the tin market in the past has been the fact that little or no stock was carried in reserve, the trade keeping only a few days' supply on hand and awaiting the arrival of steamers either from London or the far East to replenish its stock. Consequently, when there was any cessation in its movement the price was forced up rapidly and when the demand fell off, even slightly, the price declined far more than the law of supply and demand warranted. The fact that tin has been a speculative football for generations in the London market has in a large measure accustomed people to its frequent and sharp movements.

Heavy Consumption in Tinning Black Plates.

The manifold usage of tin in one form or another is little realized by those who are connected with only one branch of the consuming trade. The manufacture of tin and terne plate is easily the largest single use, and when to the tin consumed in this industry is added that utilized in soldering sheets together, either in the form of cans or roofing, the aggregate is easily half of the total consumption in this country. The consumption, however, is not in direct proportion to the production of tin plates, as is clearly shown in the following table, compiled from fairly authoritative sources, giving the consumption of pig tin in the world and in the United States in gross tons, and the production of tin and terne plates in the United States in boxes of 100 lb., for seven years:

The World's Consumption of Pig Tin.

Years.	Tons.	Years.	Tons.
1900.....	80,000	1904.....	93,300
1901.....	83,000	1905.....	97,500
1902.....	93,500	1906.....	102,000
1903.....	94,500		

The United States Consumption of Pig Tin.

Years.	Tons.	Years.	Tons.
1900.....	31,000	1904.....	36,800
1901.....	28,500	1905.....	40,200
1902.....	38,600	1906.....	43,000
1903.....	37,500		

Production of Tin and Terne Plates in the United States

Years.	Boxes.	Years.	Boxes.
1900.....	6,780,000	1904.....	10,264,000
1901.....	8,944,000	1905.....	11,099,000
1902.....	8,198,000	1906.....	12,096,000
1903.....	9,752,000		

Taking the series of years together it will be seen that the production of tin plate per ton of pig tin gradually increased each year, save in 1901, when there was evidently some stock of pig tin left over from the preceding year. For example, in 1900 there were 219 boxes of tin plate produced per ton of tin consumed, while in 1906 280 boxes of tin plate were produced per ton of tin consumed. This can be attributed in part to the lighter coating on the tin plate, but more especially to diversified uses for tin plates. There has been a vast increase in the number of cans used without solder, such as cracker boxes, baking powder cans and canisters, as well as a gradual change from pieced to stamped household tinware requiring little or no solder. Then, too, the canning industry during the last few years has been able to get along with much less tin on account of improved methods in fastening the top of the can and from a new solderless can requiring little or no solder. With soldered cans for wet goods the tin going into the solder has been carefully estimated at about half as much as the tin used on the sheet. Another falling off in recent years in proportion to the total tin plate produced has been in the lessened use of terne plates for roofing.

Other Uses of Tin.

Next in importance to the tin plate manufacturers in the consumption of pig tin is the National Lead Company, which, although utilizing the bulk of the product of the Vulcan Detinning Company, is a large buyer of tin in the open market. This company manufactures block tin pipe and tin lined lead pipe, utilized in bottling establishments, soda fountains, breweries and kindred places. Another large use for tin is in the manufacture of tin foil, that used for wrapping candles being much purer than for bottle caps, and although the quantity in each instance is small quite a reasonable tonnage is made up from these sources. The electrical industry for its fuse blocks, in composition and as a solder, is another large user of pig tin, while the consumption of the metal in journal boxes and otherwise in brass foundries brings up a large total. The chemical companies, in the manufacture of tin crystals and bichloride of tin used to "load" silk dress goods, consume about 1000 tons annually. Scattered throughout the country in the pots connected with the 365 tinning stacks for coating black sheets there are many thousands of pounds of pig tin. This constitutes practically the only reserve supply of tin and acts as an important factor during a decline in the market and falling off in the consumption of tin plate, for the metal is taken from an idle pot and used to replenish the stock in an active one.

The Roanoke Iron Works.—The Roanoke Foundry & Machine Company and the Rockhill Foundry & Machine Company, Roanoke, Va., have consolidated under the name of the Roanoke Iron Works, which has an authorized capital stock of \$100,000. H. E. Obenshain has been elected president; C. A. Moomaw secretary and treasurer, and H. B. Rockhill general manager. The officers with R. H. Angell, R. W. Kime, C. D. Denit and James E. Goens constitute the Board of Directors. The Rockhill Foundry & Machine Company has one of the largest and best equipped machine shops in its vicinity, and the Roanoke Foundry & Machine Company operates an extensive foundry and pattern shop on South Holiday street. The combination of these two plants under one management will insure an enterprise of much importance.

The turbine steamship *Lusitania* of the Cunard Line, has established a new record for the Atlantic trip from continent to continent. The vessel arrived at Sandy Hook, at the entrance to New York harbor, at 1.17 a. m., October 11, having left Queenstown at 10.25 a. m., October 6. The time of passage (including the 5 hours' time difference) was 4 days 19 hours 52 minutes. This makes the *Lusitania* a so-called four-day boat, which is a new class for Atlantic liners. The best day's run was 617 miles. The average speed for the trip was 24 knots, against the former record of 23.58 knots, held by the Kaiser Wilhelm II of the North German Lloyd Line, and 23.15 knots by the Deutschland of the Hamburg-American Line.

THE IRON AGE

Established in 1855.

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The Shipment of Unsold Lake Ores.

On the question of the Lake Superior ore supply for the coming winter and early spring months, current comment has given some significance to the statement that "it is the avowed intention of the large ore producers and sellers to bring down only enough ore to meet the requirements of furnaces, with the hope of discouraging any speculative transactions." In the old days before the steel companies and merchant furnace interests had gone into iron mining, and when the size of ore stocks on lower lake docks had some meaning, it was customary to say, after navigation had closed, that practically all the ore on dock was sold. And, in more recent years, when the unknown stocks in furnace yards mean vastly more than the known stocks on dock, in the determination of the question of the rate of ore consumption in a given year, it is rare to reach the late fall without the statement going out that the ore interests have decided to bring down no unsold ore. The traditions of the trade somehow seem to call for the announcement.

In a time like the present it scarcely requires any concerted action to "discourage speculative transactions." The accumulation of ore at high labor costs, with money tight and the probabilities favoring lower prices and a lessened rate of ore consumption, is not so attractive a proposition as to require ore producers to set their faces like flint against the temptation. Whatever question there was some weeks ago about the adequacy of the season's ore shipments to take care of the needs of the furnaces up to the opening of navigation in 1908 has disappeared. If we reckon pig iron production for the ore year ending April 30, 1908, on the basis of 27,000,000 tons per annum, the present rate, that would represent 1,700,000 tons more of pig iron than was produced in 1906. Figuring 2 tons of ore to a ton of pig iron and the usual 80 per cent. of Lake ores, this additional pig iron production would call for 2,700,000 tons more of Lake ores than were shipped last year, or a total of 41,200,000 tons, as against 38,500,000 tons in 1906. Water shipments of 40,200,000 tons and all rail shipments of 1,000,000 tons—which was the total for 1906—would thus take care of a pig iron output continued for more than six months at today's high rate, and leave the furnace yards and Lake Erie docks on May 1, next, with substantially as large stocks as they carried at the opening of navigation this year.

It is evident that there is nothing in these figures to call for any concerted restraint upon the shipment of unsold ore, or to make the question of ore prices in 1908 a matter of present concern to furnacemen.

Chinese Pig Iron in the United States.

The sending of 2500 tons of basic pig iron from China to the United States a few months ago was naturally a subject of comment. More recently the shipment to this country is reported of one or two lots of Chinese foundry and basic iron, and it is understood these will be followed by two or three additional consignments later in the year. All this iron is the product of the Hanyang Works, located about 600 miles up the Yangtse River. Such transactions have a certain interest because of their rarity, and because the sending of iron, even in stray lots, from the Orient to the greatest iron producing country is almost like making water run uphill, but it need not be said that they have no significance from a trade or economic standpoint. The relation of a New York importing firm to certain Chinese interests connected with the Hanyang operation accounts for the sending of this iron to the United States for other than the reasons usually governing export and import movements. The shipment of basic iron last summer may have yielded a small profit at the high prices then prevailing in the United States; but pig iron must needs be produced under exceptionally good practice and at low assembling and labor costs to warrant hauling it half around the globe, paying a \$4 duty and selling it to-day in competition with well-known irons in the United States.

The shipments alluded to are noteworthy as reminders that China is a producer of iron, but it is a trifle premature to write, as has been done recently in articles dealing with industrial development in China and Japan, of a fast coming Oriental independence of European and American steel products. The Hanyang works have been in existence about 15 years, but were never operated with any success until American engineers were called in about 10 years ago. At present the management is Chinese, while Germans and Belgians are employed on the technical staff. There are two blast furnaces, each of 75 tons daily capacity; two Bessemer converters, and four open hearth furnaces. The product is chiefly rails; there are also bar and sheet mills. Under favorable conditions 5000 tons of finished material per month can be turned out. Abundant magnetic and hematite ores are available in the Tayeh District, about 45 miles down the river, the mines, 15 miles distant from the river, being reached by a railroad. The magnetic ores run 63 per cent. in iron, 4 to 5 per cent. in silica, 0.05 to 0.08 in phosphorus and 0.10 in sulphur. The Tayeh deposits are estimated to contain 100,000,000 tons of ore and naturally have been the basis for optimistic predictions concerning the future of the Chinese iron industry. Japan, with a larger output of iron and steel than that of China, depends chiefly on the latter for ore, the Government steel works in Wakamatsu, Japan, obtaining 80 per cent. of its ores from the Tayeh mines. The backwardness of the Chinese operations at Hanyang, with such abundant and cheap ores near at hand, is partly due to poor and expensive coke. The most primitive methods of coke making are followed and shipments are made from Hunan province, a considerable distance to the south of Hanyang, and from the Kaiping colliery near Tientsin, far to the north, in spite of the fact that good coking coals are obtainable in much nearer districts. Cheap labor is an advantage that can be counted on indefinitely. But the mechanical faculty is quite rudimentary in the Chinese nature, and that means that any advance in iron making will be slow and painful.

The Chinese awakening, of which much is heard, may extend in time to the iron industry, but the experience of 15 years at Hanyang, with all the help of European and American talent, suggests that the day of Oriental

independence of foreign steel is remote, small as Oriental consumption has thus far been. Yet the holding of China's iron ores out of use for centuries and the rapid consumption of such supplies in other countries has undeniably some interesting possibilities for the farther future.

Industrial Education in Massachusetts.

A little more than a year has passed since the organization of the Massachusetts Commission on Industrial Education. This commission, which is definitely instructed by statute to proceed toward the actual establishment of industrial schools, has largely devoted its time to preliminary study of existing conditions and to initiatory movements looking to that result.

It has definitely recognized the need of "industrial intelligence"—that is, comprehensive insight into and intelligent interest in the various trades—as well as skill therein. It has been deeply impressed with the necessity of providing an all-round training in different trades as the only means under present conditions of developing men for the positions of foremen, superintendents and managers.

A very careful examination of over 2000 Massachusetts boys seeking employment revealed the fact that nearly 900 would have gladly remained in school longer if they could have been taught some specific trade. Fully a thousand employers have been interviewed and almost without exception have emphasized the fact that the boy is practically valueless as an industrial factor until he passes the age of 16. This condition, combined with the general dissolution of the old apprentice system, throws into purely juvenile occupations a multitude of boys and girls ranging from 14 to 16 years of age. At present these are practically wasted years. They are, however, peculiarly available for preliminary instruction in industrial lines, not for mere manual training, but in preparation for specific trades.

The commission, therefore, seeks as a finality in its plan to provide vocational training for both boys and girls of ages ranging above 14 years. Through industrial schools planned with this result in view a new educational need would be met. The work would parallel, but be independent of that of the existing higher schools. Such schools, in the belief of the commission, should offer four years of training. The first two years would include general shop instruction, mathematics, drawing, natural science and English. The work of the last two years could then be gradually completed during a longer period, in the evenings or on the part time system—i. e., the alternation of a day's work in shop and school. This latter arrangement is compulsory in many of the foreign schools, the manufacturer being required to allow the employee the time therefor. Under the conditions of higher education the University of Cincinnati is already working under this plan; two students alternating, one working in the shop one week, the other in the school, then changing places for the next week.

Of course the complete scheme of the independent school must be developed gradually, and in conjunction with individual municipalities. In the meantime immediate attention is being given to the establishment of evening schools. During the past month definite progress has been made along this line. For instance, in the city of Cambridge, evening instruction is to be furnished for machinists, pattern makers and forgers (utilizing therefor the equipment of a manual training school), and of mechanical and free hand drawing, domestic science and dressmaking. Under the provisions of the law the

State pays in this case one-half the expense. In other communities similar work is progressing. The returns from inquiries to workmen indicate a large number desirous of availing themselves of the opportunities which may be provided. Proportional returns from workmen in the mechanical trades of such a city as Worcester would, for instance, indicate fully 2000 as likely to take advantage of such instruction.

Early opposition, which existed largely through misapprehension, is vanishing, and a spirit of hearty co-operation is developing on every hand. It is becoming clearly recognized that, in order to hold its own among prosperous communities, Massachusetts must take the lead in the production of the highest and the finest grade of goods. It is practically devoid of raw material, but still proud of a population of superior workmen. But in too many industries the extremely fine division of labor gives practically no opportunity for the training of the all-round workman and his promotion to positions of greater responsibility. As a consequence foremen and superintendents are being brought from abroad, where they have received the necessary training at public expense. On the other hand, the foreigner of low intelligence, because of the simplicity of the operations which he alone is permitted to perform in many industries, readily usurps the place of the native-born, and so the candle is burned at both ends.

The aroused interest in this subject is evidenced in the organization of the National Society for the Promotion of Industrial Education, in legislative enactments in various States, and in widely distributed local effort. Enlightened manufacturers demand intelligence in their employees. They see that the pendulum has swung too far toward universal specialization in the industries; that in reducing manufacturing to a system we have not only made a machine of the operative, but we have through shortsightedness deprived ourselves to a large degree of the material from which the managers of industries must be made. It is not too late to remedy this defect, but delays will be dangerous. Our industrial structure is seriously menaced. Co-operation is needed—the hearty, intelligent co-operation of employer and employee, of legislator and educator, of man, woman and child.

A Noteworthy Mark in Pig Iron Production.

It appears certain, from information already available, that the combined pig iron production of the United States, Germany and Great Britain will pass 50,000,000 gross tons in 1907. That is an impressive aggregate, and its attainment calls for more than passing mention. That it will be reached in 1908 may be doubted, in view of present financial conditions in all three countries. Until the pendulum swings forward again the 50 million record will stand as the climax of the greatest three-year period the world's iron trade has ever known. It will be interesting to note how the pig iron production of the three leading countries has forged ahead in the three great years beginning with 1905, and what part of the increase has been contributed by the United States. Below is set down the production in each country for six years, including an estimate for 1907, the figures being in gross tons except those for Germany, which represent metric tons:

Period 1902-1904.				
	United States.	Germany.	Great Britain.	Total.
1902.....	17,821,307	8,529,900	8,679,535	35,030,742
1903.....	18,009,252	10,085,634	8,935,063	37,029,949
1904.....	16,497,033	10,103,941	8,562,658	35,163,632
Totals....	52,327,592	28,719,475	26,177,256	107,224,323

Period 1905-1907.				
1905.....	22,992,380	10,987,623	9,592,737	43,572,740
1906.....	25,307,191	12,478,067	10,149,388	47,934,646
1907 (est.).....	27,000,000	13,000,000	10,400,000	50,400,000
Totals.....	75,299,571	36,465,690	30,142,125	141,907,386

Without going into details, it may be said that the estimate for the United States for 1907 is based on the American Iron and Steel Association's returns for the first half of the year, and *The Iron Age's* statistics of coke and anthracite pig iron production in the third quarter of the year, with an allowance for a slight decrease in output in the fourth quarter. The estimate for Germany is based on official figures for eight months, and that for Great Britain on the returns just published of production in the first half of the year. Unless some radical and now unforeseen change occurs in the next two months the actual record will probably not vary one-fourth of 1 per cent. from the estimate.

The most significant feature of the figures is the fact that of the gain of 34,700,000 tons in the total for the years 1905-1907 over that for the preceding three years, 23,000,000 tons, or two-thirds, was contributed by the United States, while of the remaining 11,700,000 tons, 7,700,000 tons, or nearly two-thirds, was contributed by Germany. The great home market of the iron industry of the United States is the basis, and will continue to be, of its splendid expansion.

It will be seen that while Germany's pig iron output this year is about 53 per cent. above that of 1902 and the production of the United States is nearly 52 per cent. greater than in 1902, the increase in Great Britain is barely 20 per cent. For the three countries the increase is about 43 per cent.

CORRESPONDENCE.

Pig Iron Makers Want Cash Payments.

To the Editor: A large consumer of iron, on meeting recently the president of a furnace company, said it had been more than a year since he had used any of the latter's iron. He had formerly used it in large quantities, and wondered why it was that of late, in spite of his willingness to buy it, he had always been able to get some other iron cheaper. The ironmaster replied that he supposed he must have been pretty solidly sold up every time the other was buying. As a matter of fact, the large consumer has never paid cash for a car of pig iron in all of his business career. He has invariably given paper, and the maker of iron has for the past year been able to sell the cash customers. He has deliberately preferred them to the customers who settle by note.

All over the country makers of pig iron are beginning to take a firm stand in regard to cash settlements. They want to be paid cash in 30 days from the date of shipment, which is the usual contract obligation, and they do not wish, when the 30 days has expired, to accept a note which will mature three or four months further on.

There are few financial transactions more unreasonable than the settling of pig iron accounts by note. The greater part of the cost of making pig iron is in labor which has to be paid in cash on the very day appointed—no delay is possible. If the ironmaster buys coke, he must pay for that on the 15th of the month following the shipment, and he must pay in cash.

Pig iron runs very rapidly into money, and the customer of a furnace when he settled for pig iron by paper is simply borrowing money from the furnace. No furnace company ever yet has claimed to be a national bank. Fortunately for the trade, the custom of settling by note is not as general as formerly, the largest users of pig iron paying in cash, but there are still some consumers who insist on time. Then there is another large class of consumers who, when they buy pig iron, willingly sign a contract to pay cash 30 days from date of shipment, but who, as a matter of fact, pay cash when they get ready. The

railroads are the most flagrant offenders in this respect, and there seems to be absolutely no way of reaching them except by refusing to sell to them. With the exception of one or two railroad companies, notable for their promptness in living up to their business contracts, most of them pay from 60 to 120 days after an account is due.

AN IRON MANUFACTURER.

Steel Rails in Germany.

In announcing the closing of a three years' contract for the requirements of steel rails, ties and track material of the Prussian State roads, the German Steel Syndicate states that the prices obtained, 120 marks for the rails and 111 marks for the ties, represent an advance over 1904 of 8 marks for the rails and 6 marks for the ties. It is urged that this advance in price does not bear any relation to the increase during the past few years in wages and in the cost of raw materials. The agreement reached on the price basis named was based on the assumption that the State railroad management will consider better than hitherto the wishes for a corresponding adjustment of the freight tariffs.

The Steel Syndicate announces that a contract for 20,000 tons of rails has been closed with the Japanese State railroads, and for 16,000 tons with the Dutch State railroads for delivery next year. In the case of all these sales the prices received are considerably above those recently obtained for the Prussian State roads. The Steel Syndicate therefore claims that it has not in naming prices to the State roads utilized the protective tariff in any manner. On the contrary, the prices which can be secured in foreign countries for long deliveries of heavy tee rails are considerably higher than the prices at which the new Prussian contracts have been closed. Prices of steel rails in England are 135 to 137.50 marks. The Belgian State roads have made a new contract with the Belgian works at 159 francs, equal to about 129 marks. The Austrian State roads are paying to-day to the Austrian mills for their rail requirements 182 crowns, which is equal to 155 marks.

The Pittsburgh Coal Company's Improvements.

The Pittsburgh Coal Company is making large improvements and developments to its plants, located in Fayette County, Pa. The Colonial Coke Company, a constituent company, has at Smock about 500 coke ovens in operation. Nearby is plant No. 2, which has 30 ovens completed and by January 1 will have completed 400 ovens. At plant No. 3, at Rowe's Run, 350 ovens are being constructed and of this number 160 will be finished by January 1. The 35 ovens at Rowe's Run, together with a new central power plant, will cost \$500,000. The Grindstone plant has 300 ovens. A reservoir located at this point has a capacity of 15,000,000 gal. This plant and reservoir have just been completed at a cost of \$350,000.

Two shafts of 300 ft. each are being put down at Rowe's Run. The coal field is said to contain about 9000 acres, and two years ago, it is reported, an offer was made to the Pittsburgh Coal Company of \$8,000,000 to \$10,000,000 for this property. It received careful consideration, but the bankers who underwrote the company's bonds would not consent to this deal, unless the proceeds of the sale were applied to the retirement of the bonds. For this reason, it is understood, the company began the developments now in progress. These properties are expected to be among the richest fields in this locality. Further developments are at present under consideration for the fields located in Washington County, along the Wabash and Panhandle railroads, but work there will not likely be undertaken until next spring.

The Calumet Steel Company, whose new bar and angle mill is now in course of construction at Chicago Heights, has moved its offices from 622 Western Union Building to 626 Commercial National Bank Building, Chicago.

The Lusitania's Coal Consumption.

BY F. E. SAWARD.

On her recent Westward trip across the Atlantic, which ended at Sandy Hook on the night of Thursday, October 10, the *Lusitania* broke all speed records, both as regards time of passage, average speed throughout the trip and number of knots run in a single day. The average speed was almost exactly 24 knots per hour. This great speed record was attained by the use of an immense coal consumption, some 900 tons a day. In this connection there is a good deal to be said regarding coal, steam, knots per hour, &c. When this newest of the ocean greyhounds takes on its complement of 6000 tons, for all uses and purposes, for the trip across the water, its coal tonnage to this extent represents the work of a dozen pick miners for a year. It represents nearly as much as one coal mining machine will do in eight months. Consider what this means, as compared with any household use, and then bear in mind that this burning up of so many tons of coal goes on for 30 trips a year. Twenty tons of good coal will supply an average house of nine rooms with an abundance of heat for a whole year. What the *Lusitania* consumes in a single day would last the ordinary householder half a century. The coal used for bunker purposes will cut a large figure in our bituminous trade if these leviathans are multiplied. It is a big feature as it is.

Dr. Lardner's Calculations.

Dr. Dionysius Lardner, who was a Fellow of the Royal Society of Edinburgh and one of the foremost scientists of his day, was the author of an exhaustive treatise on the steam engine, which was published in 1838. A chapter of the book was devoted to steam navigation, and in view of the recent achievement of the *Lusitania*, "the first four-day boat," a few extracts may be of interest as showing the conditions at that time and the views entertained as to the probable future development of the steamship.

Dr. Lardner ventured that it would hardly be possible to construct a steamship capable of carrying coal enough to propel it across the Atlantic (between English and United States ports), and that the coal supply would have to be replenished at some intermediate port. He stated that as St. Johns and Halifax were both inaccessible by reason of the climate during certain months of the year, another course across the ocean should be adopted. He figured out that it would be possible for vessels to start from a point on the west coast of Ireland and proceed to St. Johns, a distance of 1900 miles, and thence go to New York, 1200 miles, were it not for the fact, already stated, that the port was closed during certain portions of the year. His idea, as distinguished from the St. Johns route, was that a vessel should start from some southern point in England or Ireland and touch at the Azores, 1800 miles distant. Thence the distance to New York was about 2000 miles. Either of these places of call would give the opportunity of replenishing the coal supply.

Some of the steamers engaged in the Mediterranean service, he said, were able to store coal in their bunkers at the rate of $1\frac{1}{4}$ tons per indicated horsepower. Assuming that it was practicable to construct a steamer able to accommodate $1\frac{1}{2}$ tons of coal per horsepower, it was calculated that, at the usual rate of consumption, this would carry the boat 2400 miles in average weather. "But," says Dr. Lardner, "as an allowance of fuel must always be made for emergencies, we cannot suppose it possible for her to encounter this extreme run. Allowing, then, spare fuel to the extent of $\frac{1}{4}$ ton per horsepower, we should have an extreme limit of a steamer's practicable voyage, without receiving a relay of coal, a run of about 2000 miles. The class of vessels best fitted for undertaking long voyages without relays of coal would be those from about 800 to 1000 tons measurement, furnished with engines from 200 to 250 hp. Such vessels could take a supply of from 300 to 400 tons of coal, which, being consumed at the rate of from 20 to 25 tons per day, would last about 15 days."

Coal Now Required for High Speed.

In these days of thousands of tons displacement, thousands of tons of coal burned during a voyage, the conclusions of the learned doctor seem absurd. It is, therefore, more than interesting to know what it means, in the use of coal, to push a ship through, over and upon the water at the rate of 24 knots an hour. In view of the current interest taken in ocean passages, as a result of the recent quick Atlantic trips, the following data are of timely interest:

A simple way of mentally converting knots into miles is to remember that for every 10 knots we must read $11\frac{1}{2}$ miles, or for every 20 knots 23 miles. While 20 knots is a trifle over 23 miles (to be exact, 20 knots equals 23.03 miles, or 1 knot equals 1.151 miles), still, the rule to add $1\frac{1}{2}$ miles to 10 miles for every 10 knots is near enough in round figures. So that the latest greyhound, making a maximum of about 24 knots per hour, was really doing better than $27\frac{1}{2}$ miles an hour—ordinary train speed.

What will a 30-knot liner burn? In the *Coal Trade Journal* several years ago appeared a brief table which is worth repeating here, showing in round figures the consumption per increase of knotage up to 20 knots, as follows:

8 knots per hour.....	8 tons per day.
10 knots per hour.....	16 tons per day.
12 knots per hour.....	32 tons per day.
14 knots per hour.....	64 tons per day.
16 knots per hour.....	128 tons per day.
18 knots per hour.....	256 tons per day.
20 knots per hour.....	512 tons per day.

But after 20 knots the coal consumption per extra 2 knots does not increase in a "just double" ratio. Thus, 22 knots would not require something like 1024 tons. Due to the laws of velocity, momentum obtained, vacuo, suction, &c., after 20 knots the coal consumption per extra 2 knots can safely be said to "progressively decrease." So, in round figures, continue the above table, always adding the inverse ratio (starting with 50 per cent. increase) as follows to the 20-knot 512-ton rate:

22 knots per hour.....	768 tons per day.
24 knots per hour.....	896 tons per day.
26 knots per hour.....	960 tons per day.
28 knots per hour.....	992 tons per day.
30 knots per hour.....	1,008 tons per day.

Or, say, with allowances for contrivances, 1000 tons in general figures for a 30-knot Atlantic racer.

The value of this calculation is verified by the statement in the first paragraph, that the *Lusitania*, running at an average of 24 knots, has to use coal at the rate of at least 900 tons a day. There is nothing like making speed, and it is a great achievement to be able to leave the Strand, London, England, on a certain day and be upon Canal street, New Orleans, a week later. It is all due to the progress made by the expansive power of steam through the influence of the heat units in coal.

Two important German iron works have made contracts for supplies of ore from Sweden, one for five years and the other for 10 years. The treaty made between Germany and Sweden last year provided for free export of Swedish ores only until 1912. In the 10-year contract referred to it is provided that each party pays half of any export duty up to 1 kroner, but if the duty exceeds that amount either party may withdraw, unless one party agrees to pay the amount in excess of 1 kroner.

The Brotherhood of Carpenters has protested to the Comptroller of New York City against the payment of bills of contractors who have done work on 41 school houses and other public buildings now under construction. The contention is that the contractors have violated the State law in using material made in factories in which the New York labor law as to hours and wages is not observed. The Comptroller refused to withhold payment, claiming that a ruling to the effect that contractors could not obtain supplies from outside the State would be in violation of the Interstate Commerce law.

Ore Explorations Active.

All the Lake Superior Ranges Extending.

DULUTH, MINN., October 18, 1907.—Exploration is as active as ever, perhaps more so, not only on the Mesaba but also on the older ranges. It is especially so on the Menominee, particularly just now around Stambaugh and Iron River, while the western Gogebic has been the scene of much activity during the past summer. This is in the magnetitic-actinolitic schists of the Penokee, west of Tyler's Forks. There are periodical attempts to find ore there, the surface and croppings indicating a favorable region, but the ore has not yet been located, and it now seems quite doubtful if sufficient concentration has taken place there to make ore in quantity. On the southern Marquette formation and the west end of the same range, indeed in its center, at Nagaunee and Ishpeming, much diamond drilling is going on in spite of a seeming lull in the iron market and the chances that there will be a considerable let up in shipments the coming year. In this respect the iron trade is different from a few years ago, when the first sign of lull in demand scared off prospective purchasers of iron lands to such a degree that these lands almost at once became a drug on the market and could not be disposed of at any reasonable figure.

The Huron Mining Company, owner of the Youngs mine at Stambaugh, has taken an option on property at the Armenia location and will explore there this winter. The Buffalo & Susquehanna Iron Company explored this tract last year but the formation is very promising and the new operators think there may be ore somewhere on the land in spite of former unfavorable results. Several other explorations are being started in the vicinity.

South of the Mesaba.

During the past few weeks there has been a considerable inquiry for property on account of the supposed possible value therein for iron ore, in T 55 16. This is south of the Mesaba range and from 12 to 15 miles from Biwabik. There is one large outcropping of iron formation in section 28, lying near a lake, but it is not certain whether it is ledge or float. Were it not for the character of the parties buying lands there, the matter would be of little interest. Some 10 or 12 years ago the writer knew of the presence of iron ore close to the locality where these purchases are being made, but it then seemed that the ore, which was encountered close to the surface and was penetrated in holes a few feet deep, was merely a wash or bog deposit. Some of the samples then secured looked very much like ochre, while some were of a finely comminuted ore of reasonably fair grade. There was nothing, however, to indicate that the township, or any locality south of the true Mesaba District, would become of value for its iron mines. So far as any work done lately has come to the knowledge of the public, this conclusion may still be good. But the people who are investing money in the district are known as successful iron ore men, of much experience and good judgment.

Operations Showing Continued Mining Interest.

The Spring mine, in section 12-59-14, easternmost property of the Mesaba District, is to send out two cargoes this fall. It has been under development this summer, and the Duluth & Iron Range Railroad has built to the property, which lies 3 miles northeasterly from the Mayas, formerly the limit of the road. The Spring was the old Mallman, where some 250,000 tons of excellent Bessemer ore was found some years ago, but it is stated that the new operators have found a very large extension of the property, to the south of the former deposit, and that they may have as much as 2,000,000 tons in sight, some of it a high grade to be mined by open pit, and some of a lower grade and to be mined underground by shallow shafts. Some work of an exploratory nature is being carried along east of the Spring, in 60-12 and 13, but though there are extensive areas of surface indications and no little ore on top of the ground, it is still uncertain if large deposits have been found, or if that part of the Mesaba will ever prove an important region.

There is a possibility that the St. James' mine of Corrigan, McKinney & Co., closed down indefinitely a few days ago, may be reopened as unexpectedly as it closed. The property is one of their largest mines, is well equipped and is all ready for a large production. It is underground on the eastern Mesaba range.

Continuous, but small, shipments are being made from the mines of Coleraine, part from washeries and part as mined from the Holman pit. But one unit of the proposed washing works is now installed, and this is working more or less steadily, in an experimental way, the separated product coming to docks. It is a suitable and desirable ore, and another year will see great volumes of this material coming down the road.

The Pillsbury, at Hibbing, has been working one shovel in ore during the year, and has made shipments on single days as high as 7000 tons, while its average has been from 4000 to 4500 tons a day. The mine will make a product for the year far in excess of any preceding season. It has been changed from an underground to a stripped mine, and contractors are still working on the removal of its overburden.

A Great Undertaking at the Loretto.

The Loretto mine, on the Menominee range, has closed for some time, while a new channel is being made for the Sturgeon River, which flows too close to the mine workings and under a portion of its ore deposits. The men who have been at work in the mine, about 200, will be engaged in the channel, and in opening new levels and running new underground drifts into ore bodies that will be available when the river has been turned aside. The Loretto is practically surrounded by water, the Sturgeon River bounding its east side, while Pine and the smaller Black Creek bound its other three sides, leaving but a small neck of land connecting it with the other side of the streams. Easterly drifts at the depth of about 300 ft. are under the Sturgeon, and from the bottom of the river to the top of the workings in these drifts is nearly all ore of good quality, a very large tonnage being thus tied up. Indeed this ore is generally conceded to extend easterly to and in the ground of the Eleanor property, on which the Loretto has a lease, and which it will mine from present workings when the latter can be safely extended. This will make the mine a very much more important producer and insure it a long term of life.

The proposed channel for the river is to start about 1200 ft. from the mine and cross Black Creek, which it will also drain, and will be about 3000 ft. in length. At some points the excavation for this channel must be more than 50 ft. in depth, though for most of its course it is in shallow marshes. A good deal of the material to be moved is rock. The job is the largest of its kind ever undertaken in Michigan.

A few days ago there was a cave at the Loretto, taking down a mass of overburden 90 x 400 ft. and down to the sixth level. The cave was anticipated and arranged for, and no injury to mine or employees resulted. It is one of the largest caves that has occurred in that range for a long time.

The old Northwestern and Metropolitan mines in the Felch Mountain District of the Menominee are to resume operations. The Northwestern mine was reopened once before, some 10 years ago, and then christened the Northern; exploration at that time revealed a large quantity of 50 per cent. ore, which will now be available. G. A. St. Clair of Duluth is to carry out the new work, and has already made proper arrangements. He will sink the shafts to a much greater depth, and hopes to get good ores lower down. A statement made in this correspondence a week or two ago as to the connection between Messrs. Whiteside and La Rue of Duluth as to explorations in lands on the Menominee range was incorrect. Both men are at work there, but not together. They were associated in the Baraboo District.

Progressive Mining Companies.

The Gogebic range now has five large steel lined shafts, with six more under construction. There are a number of steel head frames at various points on the range, and all the shafts under construction will be equipped with

them. With one or two exceptions these shafts are in the footwalls, well back from the ore, with which they are connected by crosscuts at various levels. Ore bodies of magnitude are being found deeper than ever on this range, and results recently at such mines as the Newport, which has been made one of the big mines of the district by developments below the 1700-ft. level; at the Atlantic, which is now sinking a steel shaft to 2200 ft.; at the Tilden, which was thought a worked out scam not long ago, and at other Oliver Company mines, which are pushing deeper and deeper year by year, indicate that the Gogebic is far from its maximum.

At the new town of Gwin, that the Cleveland-Cliffs Iron Company is starting at its new district of Princeton, south of the main Marquette range, the company has more than 50 dwellings nearly completed and is building more, and no construction will be permitted by outside parties until that work is done. The town will have many attractive features, including wide streets, with grass plots in the centers of the main thoroughfares, while all trees possible, from the former forest, are left standing to make the nucleus of a shaded town and of parks. Along the river are many fine elms, and there are natural park reservations left about the place. Reservations have been made for churches, public buildings and the like, and all trades of unattractive character, whose propinquity would mar the immediate surroundings, will be placed on side streets. Sewer and water works plants will be installed by the close of this year.

Michigan Mine Inspectors' Reports.

The annual mine inspectors' reports for Iron and Dickinson counties, Menominee range, Mich., make the following comparison:

	Dickinson County.	Iron County.
Production for year gross tons.....	2,574,875	2,092,517
Increase (dec.)	104,949	243,320
Men employed.....	3,392	2,511
Tons mined per man.....	756	854
Men killed in mines.....	7	25
Men killed per 1,000 employed.....	2	10
Tons mined per man killed.....	367,838	83,700

This record, as far as Dickinson County is concerned, is very remarkable in the small number of deaths among miners, and it contrasts most sharply with the neighboring county. Four of these accidents occurred underground and three on surface, and it is worthy of note that not one of the surface fatalities was while the miner was engaged in his work, since two met death at railroad crossings and the third was run over by a wagon, so that neither of them should properly be charged to mine fatalities.

The 7500-ton steel ship of the Lackawanna Steel Company, carrying down the lakes its second cargo of iron ore, and less than a month out of the builders' hands, sank in Lake Superior a few days ago, with 22 of the crew of 23 men. The surprising explanation is made that the cargo shifted and the vessel, thrown on its beam ends, took water through the steel hatch tops faster than the pumps could handle it.

The weather is remarkably good for the ore trade and shipments are continuing in heavy volume, with this month probably pretty well up to the record, and far ahead of October, 1906. It looks now as though the month would see at least 750,000 tons more from the head of the lake than the corresponding period last year. This will far more than offset any possible diminution for the month from older ranges. Indications grow that mining companies, perhaps outside of the United States Steel Corporation, will curtail shipments the coming year quite a little.

D. E. W.

The Pittsburgh Emery Wheel Company.—A company with this name has been organized at Pittsburgh with a capital of \$50,000, and has bought five acres of land at Rochester, Pa., on which it proposes to build a plant for the manufacture of emery wheels, to have an initial capacity of 5000 wheels per month. Plans call for the building of four large kilns and a grinding, mixing and packing building to be 50 x 130 ft. A 50-hp. engine and an 80-hp. boiler will be installed. As soon as the

emery wheel plant is in operation it is the intention of the company to build and equip a machine shop for the manufacture of grinding and polishing machinery of a new design. The leading stockholders of the new company are men familiar with the details of the manufacture and sale of emery wheels. Charles G. Smith of the Charles G. Smith Company, Park Building, Pittsburgh, is president; D. B. Hyde, formerly of the Safety Emery Wheel Company, vice-president and works manager; Albert W. Smith, treasurer, and J. W. Hetzel, secretary, both of the Charles G. Smith Company.

The Machine Tool Export Trade.

BY G. P. ALTENBERG.

During the past three years machine tool manufacturers have been so crowded with domestic orders that, notwithstanding the almost universal increase in the productive capacity of their plants, they have either neglected or curtailed their exports. Domestic customers were ready to buy, and wanted the goods badly enough to pay a considerable advance over quotations ruling a few years before. Meantime, European machine tool manufacturers did not advance their prices materially; consequently the foreign trade gradually drifted to European producers.

In this policy American firms were very shortsighted. They had spent years of effort and great sums in building up foreign connections. When confronted with the question of holding that trade, and denying themselves the extra profit to be made by selling to domestic customers at the slightly higher price here obtainable, they fell under the temptation and insisted on their foreign customers paying the advanced price obtainable here from people who were willing to pay a premium for quick delivery, with the result that they lost many of their best foreign customers. A business depression is now upon us, and is likely to continue until 1909, as railroads and other large corporations will be unable to do any new financing until after the Presidential election, when capital will know what to expect from the politicians.

To recover their foreign trade will cost the manufacturers much more than the extra profit they made on the tools sold to domestic instead of foreign customers. This is not, however, the greatest loss. This loss only affects each individual. The loss to the nation is that if a broad policy had been pursued the country would now have a greater credit balance in Europe, when every little counts for much in international finances. Since, however, the individual manufacturer naturally only considers his own loss or gain, it is well to consider the present position of the foreign competitor and the difficulty of dislodging him and coaxing back the old customers—a by no means easy task, since many will say: "When business was good in America, you had no use for us, and did not want our orders; now you are hard up and ask us to forsake those who came to our rescue."

The foreign manufacturers, especially those in Germany, have equipped their factories with the latest improved machinery. This is especially true of those manufacturing metal working machinery, while those making wood working machinery have progressed less, due to individual conditions. Factories have been erected in Germany and other European countries as if there was an unlimited market for tools. Many of these factories are models in their appointments and equipment, and with their lower scale of wages can furnish equally good machinery far below what such tools cost to produce in this country. An industrial recession has also set in abroad, with the result that the foreign makers are beginning to put forth their best efforts to hold their trade and defend it against an onslaught from this side, which they deem inevitable. Those American manufacturers who wish to hold or recover their foreign trade must now bestir themselves as they never did before, and it is well for them to remember that the time has gone by when circulars in English, traveling men who do not thoroughly understand what they are selling, and cash in New York against shipment will kill what reviving tendencies they may find in export demand.

The War Ordnance Bureau's Report.

WASHINGTON, D. C., October 22, 1907.—The forthcoming annual report of Gen. William Crozier, chief of the Bureau of Ordnance of the War Department, which is always of interest to manufacturers of iron and steel, gun forgings, small arms, &c., will be an unusually important document. The bureau in the past year has performed a large amount of experimental work of permanent value to manufacturers, including the devising of thoroughly up to date methods of cost keeping in connection with the shop practice of ordnance factories, the testing of small arms which has brought about the selection of weapons of larger caliber, an elaborate investigation of the causes of erosion in high powered guns, with a view to the adoption of special steels for guns, mortars and small arms, and a large amount of research work in the bureau's well equipped testing laboratory devoted especially to the investigation of ingot metal and special steels.

The Problem of Cost Keeping.

General Crozier says on the subject of cost keeping that in determining the costs of articles manufactured, repaired, or altered at ordnance establishments, the department has been considering for several years not only the costs which arise on account of expenditures from the appropriations authorizing the work and charged thereto, but also the costs which arise from depreciation of plants and equipments, interest on capital invested, pay of officers and enlisted men, charges on account of fire, and general administrative expenses not charged against the manufacturing appropriations. At Watertown Arsenal the custom of the workmen reporting on blanks the hours of work performed by each on the various jobs was changed and a system introduced providing that the compensation of employees and the charges for labor on the various orders be based on entries made on time and job cards by registering time clocks. The charges for material are based on the accomplished receipts of the foremen, showing the delivery of the material for each job. The several costs are obtained from these vouchers semi-monthly and transferred to a monthly expenditure card for each and every order. These records are transferred monthly to a consolidated card until the completion of the order, when the record is completed and the card filed.

Work Costs Less Than That Done Outside.

Referring to the introduction of this system at Watertown Arsenal, the report says:

An innovation was made in treating the several machines as direct machines and charging the time they were engaged in accordance with the hourly rate prescribed for them. The treating of each direct machine as if it were a machinist requires that when it is idle the value thereof shall be charged pro rata as a general expense over the entire work in the shops. Provision is made for determining at the end of each year the additional cost arising from administration, idle machinery, depreciation, interest on the capital and fire charges. This additional cost will be prorated over the orders of the subsequent fiscal year in proportion to the direct and machine labor performed thereon. It is expected to introduce later an additional cost card, which will take into consideration the costs of the several components of and of the principal operations on the larger articles of ordnance property manufactured at that arsenal. This Watertown Arsenal system constitutes the Department's latest refinement of the difficult subject of cost keeping.

The costs of articles manufactured have, generally speaking, been much less than the price at which these articles could have been procured elsewhere. Thirty-six 3-in. field guns have just been completed under contract dated November 21, 1905, at a price of \$2177.90 each, exclusive of the costs of inspection. Thirty-six of these guns have also just been completed at Watervliet Arsenal, under an order of October 13, 1905, at a total cost of \$1273.92 each, which includes the charges for administration, fire, interest on capital invested and depreciation of plant.

Large Calibers for Small Arms.

As the result of tests, a special ordnance board has stated its belief that the advantages of the automatic pistol and the disadvantages of the double action revolver are such as require the adoption of an automatic pistol, if practical certainty of action is attained. None of the

weapons tested was entirely satisfactory, but favorable mention was made of the Colt, the Savage and the Luger. Two hundred Colt automatic pistols, with certain modifications recommended by the board, are under manufacture, and it now seems probable that a like number of Savage automatic pistols may be obtained. Luger pistols may also receive further trial. The board was of the opinion that the pistol finally adopted should be of the caliber .45, because of the greater stopping power of the projectile than that of the present caliber .38. Special means of increasing the stopping power of the caliber .38 bullet have been devised (proposed by Capt. Samuel Hof, Ordnance Department), but it has been deemed better to endure the slight increase of weight involved with the pistol and ammunition of caliber .45 than to adopt a cruel form of bullet of smaller caliber.

Erosion of Guns.

With regard to the investigations of erosion of guns and mortars, the report says that an effort has been made to separate the effect of erosion of the bore due to the action of highly heated powder gases from the simple wear of the bore due to friction of the rotating band of the projectile and at the same time to arrive at some conclusion as to the grade of steel most suitable for the manufacture of gun tubes. The results of both the erosion and friction tests lead to the conclusion that the metal used at present in the manufacture of gun tubes is as satisfactory as any that can be obtained.

Causes of Erosion.

The most reasonable explanation advanced for the erosion of guns appears to be that the effects are due to the softening and washing away of a thin skin of metal at the surface, subjected to the highest temperature and pressure, at each round, by the extremely hot gases in contact with it. This explanation covers all the points which have been raised. The report adds:

Referring to the more pronounced action in larger guns, J. F. Meigs of the Bethlehem Steel Company has very serviceably drawn attention to the fact that the hot gases are in contact with the surface of the bore for a greater length of time in large than in small guns, and has stated a very striking law, about as follows: "In similar guns similarly loaded the duration of equal pressures and temperatures, and hence of equal erosive effects, is directly proportional to the caliber." Under this law, if large guns are to be given a reasonable accuracy-life, they cannot be made similar to small guns—that is, with dimensions proportional to the caliber—and similarly loaded. It is necessary to reduce the time of action of erosive pressures and temperatures, either by using small charges of quicker powder, thus reducing the time of action, or less reduced charges of powder not so much quickened, either method being accompanied by a reduction of velocity for a given length of bore. . . . When the relative values of the causes producing erosion shall have been accurately determined, guns can be designed which, for a given caliber and muzzle velocity, will have the powder, weight of charge, chamber capacity and other conditions involved so adjusted as to insure the longest possible accuracy life.

Tests of Ingots and Special Steels.

The work of the testing laboratory of the Ordnance Bureau during the past two years has attracted much attention. Ingot metal, as illustrated in the Harmet process of fluid compression, has been further examined. The lack of structural homogeneity has been shown to extend practically to all parts of the ingot, and though the arrangement and shapes of the defective portions had been evidently modified by the fluid compression, the presence of defects throughout the ingot show that the lack of homogeneity had only been obscured to a certain degree. Further tests in this direction will be made. Additional work has been done in testing concrete columns, plain and reinforced, and brick piers.

An increase in the appropriation for the laboratory was made at the last session of Congress, which will permit of enlarging the work. Attention will be especially directed to the investigation of ingot metal, to blooms and billets and rolled or hammered shapes from ingots, to special steels and their treatment, and generally to data connected with mechanical engineering problems.

W. L. C.

The Fort Pitt Bridge Works, Pittsburgh, works at Canonsburg, Pa., has opened a branch office in the Fisher Building, Chicago, with A. R. Young in charge.

New Massachusetts Boiler Rules.

The new Massachusetts Board of Boiler Rules (State Boiler Inspection Department), which resulted from the agitation consequent upon several serious boiler explosions, has just issued its full set of rules. The first installment of these rules was published in *The Iron Age* of September 26, comprising the sections on maximum pressure on boilers, shearing strength of rivets, factors of safety and fusible plugs. The substance of the remainder of the rules follows:

Rivets, Stays and Appendages.

When the size of the rivets in the longitudinal joints of a boiler is not known, the diameter and cross sectional area of rivet, after driving, shall be taken as follows:

	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.	Inch.
Thickness of plate....	1/4	5/32	3/16	11/32	3/8	7/16	13/32	7/16	7/16	15/32	1/2	9/16	5/8
Diameter of rivet after driving	11/16	11/16	3/4	3/4	3/4 up to 2 pitch.	13/16 over 2 pitch.	13/16	7/8 up to 2 1/2 pitch.	15/16 over 2 1/2 pitch.	15/16	15/16	1 1/16	1 1/16
Cross-sectional area of rivet after driving....	0.3712	0.3712	0.4418	0.4418	0.4418	0.5185	0.5185	0.6013	0.6903	0.6903	0.6903	0.8866	0.8866
	sq. in.	sq. in.	sq. in.	sq. in.	sq. in.	sq. in.	sq. in.	sq. in.	sq. in.	sq. in.	sq. in.	sq. in.	sq. in.

The maximum allowable strain per square inch net cross section for weldless mild steel stays shall be as follows:

Type.	Size up to and including 1 1/2-in. diameter or equivalent. Pounds.	Size over 1 1/2-in. diameter or equivalent. Pounds.
Head to head or through stays....	8,000	9,000
Diagonal or crowfoot stays.....	7,500	8,000
Screwed stays (stay-bolts).....	7,000	7,000

For welded stays or wrought iron stays or stay-bolts the strain allowed per square inch net cross section shall not exceed 6000 lb.

Each boiler shall have a safety valve the minimum area of which shall be in accordance with the following tables. If more than one safety valve is used the minimum combined area shall be in accordance with the following tables. When the conditions exceed those on which the tables are based the formula shall be used. A table of areas of grate surface in square feet for pop safety valves follows:

W 70		A = Area of safety valve in square inches per square foot of grate.					
A = $\frac{W}{P} \times 11$		W = Weight of steam per second.					
		P = Pressure, absolute.					
		75	100	160	160	200	240
		W = $\frac{3600}{P}$	W = $\frac{3600}{P}$	W = $\frac{3600}{P}$	W = $\frac{3600}{P}$	W = $\frac{3600}{P}$	W = $\frac{3600}{P}$
		P = 40	P = 65	P = 115	P = 140	P = 190	P = 240
		A = 0.401	A = 0.329	A = 0.297	A = 0.244	A = 0.224	A = 0.213
Gauge pressure per square inch at which safety valve is set to blow.....		Zero to 25 pounds.	Over 25 to 50 pounds.	Over 50 to 100 pounds.	Over 100 to 150 pounds.	Over 150 to 200 pounds.	Over 200 pounds.
Diameter of valve in inches.	Area of valve in square inches.	Area of Grate in Square Feet.					
1.....	0.7854	2.0	2.4	2.7	3.2	3.5	3.7
1 1/4.....	1.2272	3.1	3.8	4.2	5.0	5.5	5.7
1 1/2.....	1.7671	4.5	5.4	6.0	7.2	7.9	8.3
2.....	3.1416	7.9	9.6	10.6	12.9	14.0	14.8
2 1/2.....	4.9087	12.3	15.0	16.5	20.0	21.9	23.0
3.....	7.0686	17.6	21.3	23.8	29.0	31.5	33.2
3 1/2.....	9.6211	24.0	29.3	32.4	39.4	42.9	45.2
4.....	12.5660	31.4	38.2	42.3	51.5	56.0	59.0
4 1/2.....	15.9040	40.0	48.4	53.5	65.0	71.0	74.7
5.....	19.6350	49.0	60.0	66.0	80.0	88.0	92.1

A table of grate areas in square feet for safety valves (other than pop safety valves) follows; this table is in ratio to the table for pop safety valves as 2 is to 3:

Gauge pressure per square inch at which safety valve is set to blow....	Zero to 25 pounds.	Over 25 to 50 pounds.	Over 50 to 100 pounds.
Diameter of valve in inches.	Area of valve in square inches.	Area of grate in square feet.	
1.....	0.7854	1.4	1.6
1 1/4.....	1.2272	2.1	2.5
1 1/2.....	1.7671	3.0	3.6
2.....	3.1416	5.3	6.4
2 1/2.....	4.9087	8.2	10.0
3.....	7.0686	11.7	14.2
3 1/2.....	9.6211	16.0	19.5
4.....	12.5660	21.0	25.5
4 1/2.....	15.9040	26.7	32.3
5.....	19.6350	32.7	40.0

Each safety valve must have full sized direct connection to the boiler and full sized escape pipe which shall be fitted with an open drain to prevent water lodging in the upper part of safety valve or escape pipe. When a boiler is fitted with two safety valves on one connection this connection to the boiler shall have a cross sectional area equal to or greater than the combined area of the two safety valves. Safety valves having either the seat or disk of cast iron shall not be used. The seats of all safety valves shall be inclined at an angle of 45 degrees to the center line of the spindle.

A certificate of inspection shall not be issued on a boiler used for heating purposes exclusively permitting the boiler to be operated at a pressure in excess of 15 lb., if the boiler is provided with a device (safety valve) limiting the pressure carried to 15 lb.

Gauges, Stop and Check Valves, &c.

Each boiler shall have a steam gauge connected to the steam space of the boiler by a siphon or equivalent device, sufficiently large to fill the gauge tube with water, and in such manner that the steam gauge cannot be shut off from the boiler except by a cock with T end, placed directly on the pipe under the gauge. The dial of the gauge shall be graduated to not less than one and one-half times the maximum pressure allowable on the boiler.

Each boiler shall be provided with a 1/4-in. pipe size connection for attaching inspector's test gauge when the boiler is in service, so that the accuracy of the boiler steam gauge can be ascertained. Each boiler shall have one fusible plug, as required by rules on fusible plugs; one water glass, the bottom end of which shall be above the fusible plug and lowest safe water line; two or more gauge cocks, located within the range of the water glass, when the maximum pressure allowed does not exceed 25 lb. per square inch, and three or more gauge cocks when the maximum pressure allowed exceeds 25 lb. per square inch.

Each steam outlet from the boiler shall be fitted with a stop valve. When a stop valve is so located that water can accumulate ample drains shall be provided. Each boiler shall have a feed pipe fitted with a check valve, and also a stop valve between the check valve and the boiler, the feed water to discharge below the lowest safe water line. Means must be provided for feeding the boiler with water when the maximum pressure allowed is carried on the boiler. Each boiler shall have a bottom blow-off pipe fitted with a stop valve or stop cock and connected direct to the lowest water space of the boiler.

Where a damper regulator is used, the boiler pressure pipe shall be taken from the steam space of the boiler and shall be fitted with a stop valve or stop cock. Each boiler fitted with a Lamphrey boiler furnace mouth pro-

tector, or similar appendage, having valves on the pipes connecting it with the boiler, and shall have these valves locked or sealed open, so that the locks or seals will require to be removed or broken to shut the valves.

The main return pipe to a heating boiler of the gravity return system shall have a check valve, and also a stop valve between the check valve and the boiler. When there are two connected boilers one check valve may be placed on the main return pipe and a stop valve on the branch pipe to each boiler.

A boiler having 1 sq. ft. of grate surface shall be rated at 3 hp. when the safety valve is set to blow off at over 25 lb. pressure per square inch. A boiler having 2 sq. ft. of grate surface shall be rated at 3 hp. when the safety valve is set to blow off at 25 lb. pressure per square inch or less.

When a boiler is tested by hydrostatic pressure the maximum pressure applied shall not exceed one and one-half times the maximum working pressure allowed, except that twice the maximum working pressure allowed may be applied on boilers permitted to carry 25 lb. pressure per square inch or less, or on pipe boilers. When making annual inspections on boilers constructed wholly of cast iron, or on pipe boilers, a hydrostatic pressure test of not less than one and one-half times and not more than twice the maximum working pressure allowed shall be applied.

The Association of Iron and Steel Electrical Engineers.

The above named organization was recently formed in Pittsburgh, and is composed of electrical engineers and superintendents of power plants of a number of the leading iron and steel works in the country. Most of them were present at an exhibit of electrical apparatus of special designs for service in iron and steel works, shown by the Westinghouse Electric & Mfg. Company at East Pittsburgh. Invitations to attend this exhibit were issued by that company to superintendents of electrical departments in iron and steel plants, and among concerns requested to send representatives were the following:

The Colorado Fuel & Iron Company, American Steel & Wire Company, Carnegie Steel Company, La Belle Iron Works, Phoenix Iron Works, Republic Iron & Steel Company, Youngstown Sheet & Tube Company, Illinois Sheet Company, National Tube Company, Alan Wood Iron & Steel Company, Lorain Steel Company, Jones & Laughlin Steel Company, Seneca Iron & Steel Company, Pennsylvania Steel Company, American Bridge Company, Inland Steel Company, Lackawanna Steel Company, Bethlehem Steel Company, Lukens Iron & Steel Company, Maryland Steel Company and Midvale Steel Company.

The above companies, and many others as well, use in their plants electrical machinery manufactured by the different concerns, and in the past it has been necessary for each member, in case of trouble coming up, to work out for himself the solution as to its cause, or to communicate individually with other superintendents of electrical departments, who were operating electrical machinery of a similar kind. It is the purpose of the members of the newly formed organization to co-operate as far as possible for the purpose of avoiding unnecessary repetition of explanations regarding various types of electrical machinery and to spread information regarding the success or failure of apparatus in use in plants represented in the membership. By following this policy the organization hopes to save its members a good deal of trouble experienced in operating electrical machinery, which is not doing satisfactorily the work for which it is intended. In addition to these benefits, the members of the organization will endeavor to co-operate with the manufacturers of electrical equipment by giving them the benefit of their personal experience with the types of apparatus most generally in use, and will point out any troubles in operating electrical machinery by which the manufacturers may overcome any defects existing and gradually produce electrical machinery that will be better suited to the exact requirements of iron and steel rolling mill practice.

Future meetings, at which the different electrical concerns will discuss their various types of apparatus with members of the association, will be of an executive character, all representatives of other electrical companies being excluded during the time assigned to any one company. By following this policy the association hopes to establish a feeling of mutual interest between the manufacturers of electrical equipment and the users, and to bring the two into closer relationship. The association has arranged to hold three regular meetings each year, but additional meetings may be called at any time by the Executive Committee. Among the business transacted at the last meeting was the election of officers, which resulted as follows: James Farrington, superintendent of electrical department at La Belle Iron Works, Steubenville, Ohio, president; J. C. Reed, electrical engineer of the Pennsylvania Steel Company, Steelton, Pa., first vice-president; G. W. Sturgess, electrical superintendent of the Lackawanna Steel Company, Buffalo, N. Y., second vice-president; G. H. Winslow, electrical engineer of the National Tube Company, Pittsburgh, secretary; E. W. Yearsley, electrical engineer of the Midvale Steel Company, Philadelphia, treasurer.

Among those who addressed the convention were E. W. Yearsley, George W. Richardson, B. D. Rushmore of the General Electric Company, Schenectady, N. Y.; D. S. Kendall, Alliance Machine Company, Alliance, Ohio; Gano S. Dunn, Crocker-Wheeler Company, Ampere, N. J.; A. C. Eastwood and O. Pirtle, Electric Controller & Supply Company, Cleveland, Ohio; C. T. Henderson, Cutler-Hammer Mfg. Company, Milwaukee, Wis.; B. A. Behrend, Allis-Chalmers Company, Milwaukee, and R. P. Jackson and P. M. Lincoln, Westinghouse Electric & Mfg. Company.

The National Metal Trades Association.—All members of the Administrative Council and Commissioner Wuest were present at the meeting held October 16 and 17 at the offices of the association in Cincinnati. The next annual meeting of the association will be held in New York City in March, and President Barker will determine the date and announce it later. The report of the Committee on Constitutional Amendments was received and accepted, and certain provisions recommended will be carried out. The Executive Committee will meet at the Engineers' Club, New York, November 13. The Committee on Closer Affiliation with foundrymen advised the formation of a National Conference Board composed of representatives of both associations. The Committee on Winona Technical Institute reported \$8000 worth of tools and memberships contributed by members of the association. The Finance Committee was gratified with the reports from various sources.

Charles M. Schwab of the Bethlehem Steel Corporation addressed a large gathering of influential men of San Francisco in the Board Room of the Merchants' Exchange, October 19, making the statement that he had decided to continue the Union Iron Works and to modernize the plant at a cost of \$1,000,000 and enlarge its capacity. He further proceeded to advise his hearers that the conditions of industrial warfare existing in San Francisco cannot continue; that the unusual and abnormal scale of prices for labor imposed by the unions on capital in the city must fall; that he is not an enemy of organized labor, but is opposed to the way in which labor unions are administered to-day; that San Francisco "cannot help succeeding," and that the city has before it a future greater in industry and commerce and economical achievement than in its past.

Charles H. Birmingham, who operates a brass foundry at 231 South Exeter street, Baltimore, Md., has purchased about 6 acres of land on Washington road at the junction of the Baltimore & Ohio and Pennsylvania railroads, where he will establish a brass foundry, wire mill, rolling mill and metal testing plant. Plans for the new plant have not been entirely completed.

Trade Publications.

Conveying and Power Transmitting Machinery.

Chain Belt Company, Park street and Eleventh avenue, Milwaukee, Wis. General catalogue No. 35. Size 6 x 9 in.; pages 287. Cloth binding. Contains a logical presentation of a complex subject. Beginning with elevating and conveying machinery, information of use in designing and laying out equipments is given including among other things the specific gravities and weights of various substances and proper speeds. Illustrations tell better than words the possibilities in the handling of material, these being taken from actual installations, and also give ideas of the applications suitable in various industries. Conveyors and elevators separately and in combination are shown, including water elevators for irrigation, drainage, &c. The next section deals with chain belts and sprocket wheels, giving tables of horsepower transmittable with various types of chains, a price-list of standard detachable chain belts and special links, followed by a number of illustrations and specifications of different sizes of chain. The illustrations in all cases are full size, which considerably facilitates the purchaser's selection of a chain best suited to his requirements. Riveted pintle chain and interlocking bolted roller chain belts are similarly treated, and attachments for all kinds are also illustrated. Other types of chains described are malleable pin chains, interlocking renewable chains, case hardened steel bush chains, special driving chain belts, transfer chains, conveyor chains, &c. A succeeding section deals with sprocket wheels, special wheels (giving price-lists and specifications), clutches, shifters, spur and bevel gears, pulleys, friction clutches, chain tighteners, and other parts in power transmission equipment. Bucket elevators, spiral conveyors, wrought steel hangers and various forms of bearings and parts for shafting transmission and miscellaneous equipment conclude the book. An elaborate index is appended.

Abrasive Machinery.—Royden Marble Machinery Company, Metropolitan Life Building, 1 Madison avenue, New York City. Catalogue. Size 6 x 9 in.; pages 48. Deals with abrasive machinery for use in the marble, slate and soft stone trades. The designer of the machines illustrated started experimenting with carborundum on marble early in 1904, and developed as fundamental types of machinery a drum rubber, turning-head coper, gang coper, cut-off coper, two-wheeled molder, countersinker, continuous feed face polisher, polishing rings and blades. All of these machines are illustrated and described, preceded by a brief description of the carborundum process, which differs in many ways from the present method of working marble. A machine for assembling mosaic strips and a floor polishing machine are also illustrated, and an appendix contains a paper by J. Royden Pierce on abrasives which is of considerable value.

Twinvolute Turbine Pumps.—Watson-Stillman Company, 25 Dey street, New York City. Sectional catalogue No. 72. Size 6 x 9 in.; pages 48. An assortment of sheets selected from over 800 pages of the company's printed matter and especially relating to turbine pumps. Gives a description of the twinvolute turbine pump, first dealing with the single stage pump, the construction and operation of which is explained, and then in similar manner with the two-stage pump. Line drawings show sections and details and half-tone engravings the complete pump variously equipped with respect to drive by direct or alternating current electric motors. Tables of dimensions of single and double stage twinvolute pumps are given, and information in connection with pump installation designing in the form of tables, &c. The last few pages deal briefly with the contents of the company's other sectional catalogues. Loose leaves from other of the company's catalogues call attention to special products, for example page 69, sheet 11, gives a price-list of sizes of claw hydraulic jacks; sheet No. 280 gives specifications of a small single plunger pressure pump; sheet 125 deals with swivel slaw hydraulic jacks, and sheet 178 with a hand-power car axle straightening press.

Trussed Concrete Work.—Trussed Concrete Steel Company, Detroit, Mich. Bulletin and illustrated booklet. The bulletin aims to describe in simple terms what reinforced concrete is, its history and present development as exemplified in the Kahn system, and deals in particular with the principles and advantages of the Kahn trussed bar. The booklet deals with this system of reinforced concrete as applied to mills and factories. It contains a large number of illustrations from photographs of buildings constructed in accordance with this system, with brief remarks as to each photograph.

Brick and Tile Machinery.—Arnold-Creager Company, New London, Ohio. Twenty-seventh annual catalogue. Size 7½ x 7½ in.; pages 70. Following a brief account of the various ways of making brick, the pages of this book give quite exhaustive illustrated descriptions of the company's various types of brick making machinery operated by animal or steam power. Similarly descriptions are given of pug mills, disintegrators, modern machinery for making brick, tiles and hollow ware by the semi-dry or stiff clay process, and finally deals with handling apparatus such as trucks and barrows, and special machines and parts. An interesting section deals with roofing tile and shows in color examples of tiles made on the company's machines.

Pattern Makers' Supplies.—Cleveland Fillet Company, Cleveland, Ohio. Pamphlet. Shows illustrations of the form and size of Crescent leather fillets, with illustrated instructions as to how they should be applied, and also deals with Crescent wood fillets, hardwood and brass dowel pins, pattern letters and figures made of white metal and brass, malleable iron rapping plates, metal joint fasteners, steel fillet tools, glue, &c. The latter part of the catalogue deals with belting particularly suitable for use under trying conditions, including the Holyoke, Pequot, and submarine leather belting, and gives an illustration of the new Foley saw filing and jointing machine.

Molding Machines.—Ph. Bonvillain & E. Ronceray, 9 et 11, Rue des Envierges, Paris, France. Catalogue. Size 6¼ x 9½ in.; pages 96. Contains an exhaustive treatment of the company's universal system of machine molding, profusely illustrated. The subject matter is divided into sections. Part 1 deals with molding sand, its treatment and preparation, and Part 2 with the universal system of pattern plate molding, including the reversible pattern plate, double pattern plate, stripping and reversible "cliché" process; and machines making up a universal molding plant using standard universal hydraulic molding machines, relative universal hydraulic molding machines, hydraulic assembling machines, special hydraulic molding machines, special hydraulic assembling machines, and an automatic sand distributor. This is followed by a section dealing with a light hydraulic plant specially designed for use with the hydraulic universal molding machinery. Part 4 illustrates examples of reversible and double pattern plates with or without stripping plates made with the company's special appliances, and with them are given the approximate output in castings per hour. Part 5 is concerned with apparatus used in connection with the universal machine molding process, such as air blowers, mechanical, electrical and pneumatic rammers, core making machines, stoves and ovens, pig iron breaker, a gate cutting off machine, and a templet cutting machine.

Conveying and Handling Machinery.—C. W. Hunt Company, New York. Pamphlet No. 073. This is a condensed index to the general line of machinery manufactured by the company, showing with small illustrations and brief descriptions typical products, including steeple towers, electric cranes, overhead bridges, parabolic boom towers, elevators and supplies such as roop, sheaves, shovels and tubs, followed by a similar treatment of cable railroads, automatic railroads, steam and electric hoisting engines, conveyors, coal crackers, and accessories such as valves, chutes, screens, scales, &c. The latter part deals with industrial railroads, track, cars, and electric locomotives.

Machinery.—Brown & Zortman Machinery Company, 2533 Liberty avenue, Pittsburgh, Pa. October issue of the company's monthly publication. Contains a description of the Cincinnati Milling Machine Company's No. 4 plain milling machine, and extensive lists of second-hand and new machinery and tools which the company has in stock.

Cranes and Foundry Equipment.—Whiting Foundry Equipment Company, Harvey, Ill. Circular No. 76. This is intended merely as a key to the company's lines of manufacture, and is principally given up to illustrations with brief specifications showing typical installations of cranes of traveling bridge and jib type, the Whiting cupola, several styles of foundry ladles and tumblers, air hoists, foundry and yard trucks, turntables, track, elevators and complete car wheel plant equipment.

Fire Brick.—Garden City Sand Company Chicago, Ill. Catalogue. Size 4½ x 6½ in.; pages 28. Has particular value to those contemplating the use of fire brick in any service, and gives suggestions on the forms and materials best suited to various conditions. Matter of interest to architects and engineers is given on several pages in the shape of special information for fire brick specifications. The illustrations show the company's several brands of fire brick, giving their dimensions for standard shapes and sizes, and also calling attention to the company's facilities in turning out special shapes and a very complete line of tile. The special value of various materials for fire brick is also explained, and tables of temperatures are appended.

Ventilating Wheels.—Buffalo Forge Company, Buffalo, N. Y. Folder. Deals with Buffalo electric disk wheels made for 110, 220 and 500 volt direct current circuits equipped with either General Electric or Peerless electric motors. Dimensions are given in tabular form of the standard sizes carried in stock.

Wire Glass Windows.—James A. Miller & Bro., 129 South Clinton street, Chicago, Ill. Folder with loose leaf inserts. Concerns sheet metal wire glass fire retardant windows, discussing their importance, materials, cost and principal features. It also gives a partial list of users. Eight plates contain illustrations of examples of window sashes equipped with wire glass. Succeeding pages contain illustrations of buildings in which these windows have been installed, and testimonial letters are included.

Engines.—Houston, Stanwood & Gamble Company, Cincinnati, Ohio. Catalogue. Size 6 x 9 in.; pages 24. Begins by defining the value of a slide-valve engine, and describes the company's slide valve. This is followed with illustrations and tables of dimensions of the different sizes of the following types:

Class A heavy duty self-contained engine, class B heavy duty engine with detached outboard bearing, class D center crank engine self-contained, class B high pressure heavy duty engine with detached outboard bearing, class B heavy duty self-contained engine, class A twin engine, class B high pressure heavy duty twin engine, and detached outfits consisting of class A engines and portable firebox boilers, and a semifixed outfit on skids consisting of the same parts. A special type of engine referred to is one particularly designed for driving dynamos made in the class A and B types. The engines illustrated range in size from 7 to 12 in., with a minimum of 18 hp., to 26 x 30 in., with a maximum of 550 hp. The capacity of the works is 1000 engines per year of an average capacity of 75 hp. each.

Contractors' Buckets.—G. L. Stuebner Iron Works, Twelfth street and Vernon avenue, Long Island City, N. Y. Circular. Under the subject, "Some Buckets and What They Are Doing," this gives an abstract of an article by C. M. Ripley in *The Iron Age*, July 25, 1907, entitled "Rapid Blast Furnace Foundation Work," which dealt with the preliminary construction for the Jones & Laughlin steel plant at Allquippa Park, Pa. An abstract is also given from an article by the same author in the *Industrial Magazine* on the Manhattan anchorage for Brooklyn Bridge No. 3.

Oil Filters, Exhaust Heads and Ventilators.—Burt Mfg. Company, Akron, Ohio. Catalogue. Size 6 x 9 in.; pages 79. This is a complete catalogue of the company's products, which include the Cross, the American and the Warden oil filters, the Burt oil filtering system, the Burt exhaust head, the standard exhaust head, and the Burt combination skylight and ventilator. The introduction contains an interesting outline of the company's growth. The extended illustrated descriptions given of the various products treat of construction and operation very thoroughly, and are preceded by a discussion on the saving of the waste of lubricating oil. It calls attention to some facts which are not too well appreciated and suggests remedies for the evils cited. Tables of price-lists are given of the various sizes of apparatus made.

Lathes.—Sebastian Lathe Company, Cincinnati, Ohio. Illustrated catalogue No. 10. Size 6 x 9 in.; pages 40. Engine and foot lathes, speed lathes, lathe sets, tools and attachments are the products treated of principally in this catalogue, these being those manufactured by the company. Space is also given to planers, shapers, drill presses, machinists' tools and supplies, which the company handles.

Friction Clutches.—Carlyle Johnson Company, Hartford, Conn. Catalogue C, for 1908. Illustrates and describes the company's line of friction clutches for machinery, countershafts and line shafts. Complete with illustrations, tables of dimensions and price-lists, and an interesting table of standard clutch hub diameters for steel and wood split pulleys. These clutches are extensively used embodied in machinery as well as for shafting, by many machine tool builders and by others requiring a powerful quick-acting clutch occupying little space.

Propeller Wheels.—Michigan Wheel Company, Grand Rapids, Mich. Catalogue F. Refers to a line of speed propellers with solid and detachable blades, designed principally for small auto and motor boats. The Michigan reverse gear, for which great efficiency, durability and ease of operation are claimed, is also shown. The company has doubled its facilities by recent additions to its plant.

Auto-Meter.—The Warner Instrument Company, Beloit, Wis. Catalogue. Describes the delicate mechanism of the Warner auto-meter, an instrument for measuring and recording the rate of speed and distance traveled by vehicles. It is especially adapted to automobiles, but may be used with equally good results on railroad and other cars. A cutaway engraving shows the construction and arrangement of the mechanism, and the worm gear drive and flexible ring shaft is also illustrated. It is stated that the company is the largest manufacturer of speed recording instruments in the country, and that of the 74 cars entered in the 1907 Glidden tour, 55 used Warner auto-meters.

Motors and Generators.—Triumph Electric Company, Cincinnati, Ohio. Bulletin No. 311. This is a special bulletin printed in Spanish for circulation in the foreign trade where that language is spoken. It covers the company's line of steel frame generators and motors.

Small Tools.—Pratt & Whitney Company, Hartford, Conn. Catalogue No. 4, superseding all previous editions. Size, 4 3/4 x 7 1/4 in.; pages, 215. Pertains to the very comprehensive line of small tools, standards and gauges, including taps and dies; cutters, reamers, counterbores, taper pins, mandrels, drills, threading, knurling, cutting-off and lathe and planer tools; sockets, sleeves, punches, reducing couplings, inside and outside caliper gauges, and gauges of various special types. An introductory section gives tables and formulae for threads of the United States standard, the International or French standard, Whitworth standard and British Association standard, and strongly recommends the first. Some 12 pages of tables appropriate to the subject of the catalogue are appended.

Concrete Sewer Construction.—Blaw Collapsible Steel Centering Company, Westinghouse Building, Pittsburgh, Pa. Catalogue. Size, 6 x 9 in.; pages, 67. Contains a compilation

of descriptive matter and illustrations showing the various types and applications of what is offered as a simple, reliable and economical method of centering by the use of collapsible steel centers for the construction of concrete sewers, culverts, subways, &c. Testimonial letters and reproductions of blue prints showing the various types of centers in detail are included.

Drills.—Knecht Bros. Company, Cincinnati, Ohio. Pamphlet. Deals with the Knecht friction sensitive drill for drilling holes any size up to 9-16 in. The distinguishing feature of this drill is that ordinary spindle driving and speed changing devices such as gears, pulleys, &c., are eliminated and replaced by a simple and effective friction device.

Anti-Friction Metal.—A. Allan & Son, 486 Greenwich street, New York City. Circular. Pertains to Allan metal for facing high and low pressure piston bull rings, which is claimed to keep the cylinder in a smooth and polished condition and to reduce friction and wear.

Iron and Steel Works Machinery.—United Engineering & Foundry Company, Pittsburgh, Pa. Pamphlet. Illustrates new machinery for iron, steel and tube works, including plate, merchant, blooming and special mills, squeezers, lathes, shears, intensifiers, punches, cambering machines, grinding pans, plate leveling machines, straightening machines, saws, chilled rolls and an automobile tire vulcanizer.

Storage Batteries.—Westinghouse Machine Company, East Pittsburgh, Pa. Catalogue. Size, 4 1/2 x 6 in.; pages, 50. Devoted to the Westinghouse storage battery, giving illustrations and descriptions of the various types of plates, and also of boosters, regulators and switchboards. The Westinghouse portable batteries are dealt with showing the desirable features embodied in the construction and method of assembling.

Reinforced Concrete.—General Fireproofing Company, Youngstown, Ohio. Catalogue. Size 6 1/2 x 10 1/4 in.; pages, 32. Concerns the company's system of reinforced concrete, which is claimed to be absolutely fireproof, proof against the destructive influences of frost and dampness, and thoroughly sanitary and vermin proof. Illustrations show completed and partly finished buildings of this construction, and the descriptive matter pertains to the system in detail. Included is a report on metallographical work on cold twisted lug bars done for the company by Dr. Henry C. Boyton.

Crysolite Paint.—Semet-Solvay Company, Syracuse, N. Y. Circular. Pertains to Crysolite paint, which is especially adapted for use on iron and steel work of all descriptions. Testimonial letters and a list of some users is given.

Drill Chucks, Turret Heads, Etc.—T. R. Almond Mfg. Company 83 Washington street Brooklyn N. Y. Catalogue. Size, 5 x 7 1/2 in.; pages, 20. Contains illustrated descriptions of the Almond drill chucks, right angle transmission, turret heads, flexible arms for electric lights and flexible steel tubing. Specifications in tabular form and a telegraph code are included.

Blue Printing Machines.—Buckeye Engine Company, Salem, Ohio. Pamphlet. This is entitled "The A B C of Blue Printing," and humorously purports to be a copy of a speech delivered by Prof. A. C. Tinc before the National Federation of Blue Printers. Illustrations of the Buckeye electric blue printing machines and a partial list of users is given.

Ore Pulverizers.—W. L. McCullough Company, 1230 Majestic Building, Detroit, Mich. Pamphlet. Deals with the National ore pulverizer, for which special advantages are claimed. Descriptive matter and illustrations explain the construction and operation, and line drawings give plans of installations.

Concrete Reinforcing.—Inland Steel Company, Chicago, Ill. Booklet. Size, 5 x 7 1/4 in.; pages, 32. This is a *resumé* of information on the reinforcing of concrete, and contains several articles which have been reprinted by the company in response to many requests for general information on the subject. The titles of the articles are "Economy vs. Scamp Work in Reinforced Concrete Competition," "Mechanical Bond Without Cost," "A Remarkable Reinforced Concrete Accident," "Engineering Evolution and Reinforced Concrete," "High Carbon Steel Reinforcing Bars," "Data for Estimating cost of Concrete Reinforcement" and "The Inland Steel Company's High Carbon Steel Bars for Reinforcing Concrete." The last page concerns tests of twisted high carbon steel bars.

Locomotive Boilers.—William H. Wood, Media, Delaware County, Pa. Circular. Gives particulars of Mr. Wood's proposed improvements in locomotive boilers, for which patents have been applied for. Illustrations and brief descriptions are also given of a patent circular flanging machine, a 150-ton hydraulic sectional flanging press, a 550-ton hydraulic flanging press and a 150-ton 12 ft. 6 in. gap triple pressure hydraulic riveter.

Automobiles.—Gearless Transmission Company, Rochester, N. Y. Gives an illustrated description of the three 1907 types of Gearless automobiles, these being the models 75, 60 and 50, of corresponding horsepower capacities. The parts are all briefly dealt with, and the motors and gearless transmission mechanism are described in detail.

NEWS OF THE WORKS.

Iron and Steel.

The Imperial Steel Company, which was organized a few months ago and has its main offices in Cleveland, Ohio, has nearly completed the rebuilding of a plant it acquired near Chagrin Falls and expects to blow in nine crucible furnaces about December 1. The plant is expected to produce at the start 7 tons of crucible steel per day.

The National Tube Company, Pittsburgh, has blown in its fourth stack, "D," at McKeesport, Pa., which has a daily capacity of about 500 tons. There are now four blast furnaces at this plant in operation, with a daily output of about 1800 tons, all of which is used in the Bessemer steel plant at McKeesport.

The South Sharon plant of the American Sheet & Tin Plate Company, at South Sharon, Pa., has been closed down owing to falling off in demand. All three plants of the company located in the New Castle, Pa., district, these being the New Castle Works, 20 mills; Shenango Works, 30 mills, and South Sharon Works, 20 mills, are now idle.

Press reports that the Youngstown Sheet & Tube Company, Youngstown, Ohio, would start at once the erection of 16 open hearth furnaces are incorrect. The company will probably at some future time build some open hearth furnaces, but will not do anything in this direction for the present. It has now under erection at Youngstown two blast furnaces, four butt-weld and two lap-weld furnaces. Other than these additions nothing is contemplated at present.

General Machinery.

The Komp Machine Works, Hattiesburg, Miss., machinist and mill supplies, has awarded a contract for the erection of a three-story building of pressed brick and stone, mill construction, 90 x 90 ft., which is to be used as a storage warehouse for the machinery and mill supply department. The building will be equipped with an electric elevator and steam heating plant. The entire cost of construction is estimated at \$25,000.

The Nevada Engineering Works, Reno, Nev., has laid foundations for its new plant and will start work of construction with the intention of having the building completed before winter sets in. The new building will have a frontage of 154 ft., and will be made as nearly fireproof as possible. It will be equipped with modern machinery for the manufacture of mining and special machinery, and will cost about \$25,000 or \$35,000.

The copartnership of J. P. Danielson & Co., manufacturers of special machinery, tools and hardware specialties, Jamestown, N. Y., has been dissolved and the business has been taken over as a going concern by the Crescent Tool Company, recently incorporated and owned by members of the former firm. The new company will continue the business along the same lines as heretofore. Carl Peterson is president.

The Hauptman & Loeb Company, New Orleans, La., is now installed in its new quarters at 1717 to 1743 Magazine street. The building is 175 x 265 ft., two stories, and is occupied as a display room, office and machine shop. Five traveling cranes have been installed for handling the light and heavy machinery and other conveniences for showing its machines, pumps, boilers, &c., advantageously have been put in. The company does a large business throughout the Gulf States, especially in the sugar and rice districts, also with the countries of South America.

Power Plant Equipment.

The Escanaba Electric Pulp & Power Company, Escanaba, Mich., is negotiating with that city to furnish power for the city lighting plant. The company is now building a dam at Flat Rock, 2 miles from the city, and it is expected that this work will be completed and be ready to begin operation on January 1.

The city of Waterloo, Wis., has taken over the electric light plant and is preparing plans for the erection of a new building to accommodate power plant and electric equipment already purchased. A bond issue of \$10,000 has been made to provide payment for this improvement.

A. C. Moss, proprietor of the Campbell electric light plant, Campbell, Mo., intends to form a stock company, to be composed of business men of Campbell, St. Louis and Cairo, to enlarge the capacity of the present plant and to install an ice plant later on. It is the intention to install a new 150-kw. alternator, 150-hp. Corliss engine, 150-hp. tubular boiler and a 10-ton ice plant. The electrical machinery will be put in this fall.

The Board of Water Commissioners of London, Ont., has under consideration the extension of the water works at a cost of \$575,000. Nothing will be done in the matter until approved by a vote of the citizens. John M. Moore is engineer in charge and superintendent.

The B. F. Sturtevant Company, Hyde Park, Mass., reports the following sales of electric generating sets, which are reported by F. R. Chinnock of the electrical department of its New York office, Engineering Building: Kiernan & Hughes Company, Jersey City, N. J., one 9 x 8 in. vertical engine, 30-

kw. generator; Millard & McLean, New York, one 4½ x 4½ in. vertical engine, 5-kw. generator; Henry Steers, New York, one 4½ x 4½ in. vertical engine, 5-kw. generator, two 6 x 5 in. vertical engines, 7½-kw. generators; Sonora Company, New York, three 10-hp. motors; Washburn Brothers Company, Saugerties, N. Y., 13 x 12 in. horizontal engine, 50-kw. generator, 20-hp. motor; Eberhard Faber Pencil Company, Brooklyn, N. Y., 16 x 14 in. horizontal engine, 100-kw. generator; Department of Water Supply, Babylon, L. I., 9 x 8 in. vertical engine, 40-kw. generator; Samuel Smith & Sons Company, Paterson, N. J., 16 x 14 in. horizontal engine, 100-kw. generator; Isidor Fajans, New York, 9 x 8 in. vertical engine, 30-kw. generator; Charles Hakemeyer & Co., Paterson, N. J., 17½-kw. generator, three 5-hp. motors.

The Liberal Light, Ice & Power Company, Liberal, Kan., has let contracts for the construction of an ice and electric plant, which will be housed in a main building 60 x 65 ft., and a boiler room 32 x 42 ft., built of concrete block. The machinery equipment will include one 50-hp. three-phase motor for compressor, circulating pumps driven by a 10-hp. motor, and boiler feed and other pumps, also motor driven. The generating set will consist of two three-phase 60-cycle 2300-volt 100-kw. alternators. These will be driven by a 14 x 36 in. Corliss engine, built by the Murray Iron Works, Burlington, Iowa, and a 100-hp. Lycoming high speed engine. It is the purpose of the company to install a machine shop a little later on, for which a new equipment of machine tools will be required, including lathes, drill presses, emery grinders, &c. J. W. Tyner is superintendent.

The Rust Boiler Company, Pittsburgh, has received an order from the Warwick Iron & Steel Company, Pottstown, Pa., for four 404-hp. Rust water tube boilers, to be arranged in batteries of two boilers each. A recent order for six 608-hp. Rust boilers for installation in the plant of the Seaboard Portland Cement Company's plant at Alsen, N. Y., which order was placed through the Cement Engineering Construction Company, has been increased to eight boilers.

Foundries.

The Peerless Mfg. Company, Inc., Louisville, Ky., one of whose foundries was recently destroyed by fire, is replacing the building destroyed with a new one, which is now more than half completed and which will doubtless be in operation by November 1.

The Topeka Foundry & Machine Company, Topeka, Kan., has spent about \$5000 in new equipment for its plant and now has one of the most modern foundries in Kansas. It is busy making castings for its sub-surface packer, which is used extensively throughout Kansas in carrying out Professor Campbell's theory of dry soil culture.

The Union Machine & Foundry Company, Muskogee, Okla., has acquired the Reeves Machine Works of that city, to which a foundry was recently added. The plant as it now stands represents an outlay of about \$15,000. The new company expects to spend \$30,000 in adding to the present capacity of the foundry department. U. S. King of Iola, Kan., and A. L. Holtom of Muskogee, Okla., are interested. Mr. King is the inventor of the King gasoline engine and a mine locomotive which has proved quite popular.

The new plant of the Nashville Bridge Company, Nashville, Tenn., has been completed. During the past 12 months its business has increased 50 per cent. It is now operating in every part of the South and has several hundred thousand dollars' worth of work on hand. The new plant has been fitted out with \$20,000 worth of new machinery.

The United States Radiator & Boiler Company West Newton, Pa., whose foundry was recently destroyed by fire, has placed contract with the McClintock-Marshall Construction Company, Pittsburgh, Pa., to erect a new fireproof foundry building, 299 x 326 ft., which is to be completed in 60 days. The company expects to equip the new building with modern machinery, gas engine, cupola, blower, elevator, &c.

The Samson Iron Works, Stockton, Cal., manufacturer of gas and oil engines and stationary, portable traction and centrifugal pumps, is erecting a new foundry, 100 x 175 ft., of brick and steel, which will be equipped with two Calliau cupolas, a Pawling & Harnischfeger 10-ton electric crane and other modern machinery. An up to date brass foundry is also to be added. The foundry, which is to be operated in connection with the company's manufacturing plant, is expected to be ready to make castings in about 30 days, the main output to be gas engine and pump castings.

Bridges and Buildings.

The Southwestern Bridge Company, Joplin, Mo., has opened contracting offices at 806 Wilson Building, Dallas, Texas, J. I. Boggs, contracting engineer; 317 Culvertson Building, Oklahoma City, Okla., R. X. Basford, contracting engineer; 726 Symes Building, Denver, Colo., George A. Sears, contracting engineer. The company has recently received contracts from the Texas Central Railroad, Waco, Texas, for two through plate girders bridges; Allen Building, Shreveport, La., steel work; St. Louis & San Francisco Railroad, Springfield, Mo., 100,000-gal. tank and tower; Kansas Natural Gas Company,

Independence, Kan., four additional steel buildings. It has also the contract for all the bridges required on the line of the Joplin & Pittsburgh Interurban Railroad.

Fires.

The plant of the Pittsburg Stove & Range Company, Pittsburgh, Pa., was burned October 20, the loss being about \$50,000.

The machine shop, blacksmith shop and car shop of the Bridal Veil Lumber Company, Bridal Veil, Ore., were destroyed by fire October 13.

On October 11 fire did \$5000 damage to the Joseph Whitecar Iron Works, Philadelphia, Pa.

The plant of the Reynolds Wagon Company, Kalamazoo, Mich., was damaged \$25,000 by fire October 18.

A large fire in Brooklyn, N. Y., on October 22, destroyed the plant of Schwab Bros. & Co., manufacturers of plumbers' supplies, and badly damaged the plants of the American Safety Razor Company and the Brooklyn Show Case Company.

Hardware.

The Raymond Mfg. Company, Corry, Pa., manufacturer of springs and wire specialties, is completing an addition to its plant 16 x 100 ft., to be used for tempering and nickeling work. Machinery for the addition has been purchased and is now being installed.

The Up-to-Date Mfg. Company, Terre Haute, Ind., manufacturer of iron and wire fencing, bank and office railing, window guards and ornamental iron work of all kinds, has recently completed a two-story brick addition to its plant, 62 x 100 ft. in size, which will admit of practically doubling its capacity.

The Griffin Mfg. Company, Erie, Pa., manufacturer of steel strap, T and butt hinges and other hardware specialties, is making an addition to its plant, which is pretty well along. The machinery equipment has already been purchased.

The Niagara Wire Cloth Company, Buffalo, N. Y., is doubling the capacity of its wire weaving and galvanizing plant on Rano street and the D., L. & W. R. R. James W. Murphy, Buffalo, is president of the company, and J. H. Porter, who is president of the Calumet Steel Company of Chicago, vice-president.

Miscellaneous.

The Eaton Electric Company, Eaton, Colo., dealer in electrical supplies, which has heretofore operated under a co-partnership, has been incorporated, with a capital of \$35,000, by W. J. Farr, Roscoe Farr and G. H. Denio.

The Michigan Wheel Company, Grand Rapids, Mich., maker of speed propeller wheels, has under construction a two-story and basement brick factory, of mill construction, 50 x 140 ft. It is expected that the new plant will be completed and ready for occupancy by January 1.

The Warner Instrument Company, Beloit, Wis., manufacturer of cut meters, tachometers and automobile indicators, which was recently organized with a capital stock of \$30,000, has about completed the construction of a new plant at South Beloit. It has been the aim of the company to make this an entirely modern plant in its arrangement and equipment. The officers are James Barclay, president; A. P. Warner, vice-president and manager; C. H. Warner, secretary and treasurer.

The Husson Dyeing Machine Company, recently incorporated has purchased the patents of Joseph Hussong of Camden, N. J., who has been building and selling these machines for several years. The company will continue the manufacture of the machines in its present plant. Edwin J. Morris, president, and William McK. Morris, secretary and treasurer, are connected with Morris & Co., Groveville, N. J.

The American Steel Package Company, Defiance, Ohio, is rebuilding its plant, which was recently burned, and will require but little if any new machinery, as practically none of the equipment was damaged beyond repair.

The Chase Motor Truck Company has secured part of the old Sweet steel mill property at Syracuse, N. Y., which will be used for expanding its business. The property acquired extends 200 ft. on West street, 356 ft. on Otisco street and 100 ft. on Wyoming street. The company, which was formed in September of last year to manufacture the Chase two-cycle air cooled commercial cars, has occupied temporary quarters on East Water street, but these have become too much congested by its growing business and necessitated the enlargement of all departments. In addition to the manufacture of motor trucks, the company does a large repair business and has a completely equipped department for the sale and repair of all kinds of automobile tires. In the new plant the commercial cars will be made in the machine shop, which will occupy three floors and will have a total floor area of 21,000 sq. ft. The repair department will occupy a one-story building, 70 x 225 ft., and the sales department a one-story building, 60 x 360 ft. A. M. Chase is president; A. C. Chase, vice-president, and H. P. Bellinger, secretary and treasurer.

The Carnegie Steel Company has recently made a large addition to the machine shop at the Duquesne Steel Works, at Duquesne, Pa., in which has been installed a large amount of

modern tools and machinery, including a complete equipment of Pittsburgh high speed vises made by the Pittsburgh Automatic Vise & Tool Company, Pittsburgh, Pa.

Recent sales of boiler water purifiers made by the Welmann-Munhall Company, Pittsburgh, include an order from the Shelby Steel Tube Company to supply seven boilers, and from the Crescent Forging Company, Hulton, Pa., to supply its entire boiler plant.

The Duty on Nickel Anodes.

What is likely to be a final effort on the part of importers to secure a lower rate of duty on nickel anodes was made last week when arguments were heard by the United States Circuit Court of Appeals at New York in a test case brought by Hermann Boker & Co. The issue has already been decided adversely to the importers by the Board of General Appraisers and by the Federal Circuit Court. Boker & Co., undismayed by the action of the lower tribunals, now ask the appellate tribunal to reverse the unfavorable decisions and find in the firm's favor. The Collector of Customs classified the articles as manufactures of nickel, with duty at the rate of 45 per cent. ad valorem under paragraph 193 of the tariff act. Instead of the rate levied by the government, the importers claim the merchandise to be dutiable under paragraph 185 relating to nickel in bars or sheets at 6 cents per pound.

The merchandise in question, invoiced as rolled anodes, consists of plates of pure nickel about 12 in. long, 6½ in. wide and 7-16 in. thick, which are cut from sheets of nickel and used chiefly for suspension for nickel plating. The Board of Appraisers held that the nickel must be shown to be either "pigs, ingots, bars or sheets." Judge Hazel in the Circuit Court supported the contention of the board, that the facts in the Boker case did not bring the importation within the evident language of paragraph 185, and hence the government's assessment of duty was affirmed. The importers in their arguments before the Court of Appeals insisted that the words "pigs, ingots, bars, or sheets," are restrictive only as to forms of nickel alloys as evidenced by the fact that nickel oxide, nickel tubes and nickel in grains cannot be included in any of such restricted forms, and therefore the importation in question is clearly included in paragraph 185 as "nickel." The government attorney did not agree with the importer's claim, as it was proved, he said, that the nickel has been advanced by cutting and the plates are made capable of practical use by the mere drilling of holes in their upper ends. The board expressed the opinion that the merchandise has a distinctive name, purpose and use, and accordingly testimony was given by the importer in both the lower court and in the appellate tribunal in opposition to the Government claim. At the conclusion of the arguments the Court of Appeals reserved decision.

The Automatic Transportation Company, capitalized at \$2,000,000, and which will manufacture and install aerial carrier systems for the delivery and collection of mail, parcels and packages in rural districts, and for handling ore, &c., in the vicinity of mines, under patents of W. C. Carr, president, has purchased a site for its manufacturing plant in Buffalo, N. Y., comprising 10 acres, adjoining the Main street crossing of the Erie and Delaware, Lackawanna & Western railroads. Work has been commenced upon the initial building of the plant, which will be of concrete, steel and glass, 60 x 120 ft., and will be used for the construction of experimental and preliminary installations of the system. Additional buildings will be erected soon. This new automatic transportation system consists of electrically operated motors suspended from and running upon wire cables, supported upon a series of Y-shaped metal or concrete poles, arranged for double track on cables, elevated from 12 to 20 ft. above the ground.

China is pressing reforms. An imperial edict issued October 9 orders the Board of Revenue to introduce within six months a uniform system of weights and measures throughout the empire.

The Iron and Metal Trades

The happenings in the financial markets during the past few days have robbed the occurrences in the Iron markets during the week under review of most of their significance. It is altogether too early to judge of the effect of the financial troubles, since their extent and scope are not yet clear, and since it is impossible to judge to what extent the manufacturing and trading interests will be affected. The suspension of three of the group of Westinghouse interests is not reassuring on the latter point. It must be observed, however, that generally speaking the Iron and Metal industries have passed through a period of great prosperity and are stronger than they ever were in the history of this country. Extensions and enlargements have been conservatively made, with ample funds provided. In a few conspicuous instances new construction was suspended some time since.

Prices for Finished Iron and Steel have been kept at a moderate level, and while they will probably be adjusted to a lessened consumption, as the occasion arises, there is no prospect of any such performances as we have witnessed in Copper and in Tin.

The Pig Iron markets have been quiet. In the East, where it has come down from the boom level, the price is steady. In the South and in the Central West the deadlock between buyers and sellers continues. The hopes of an early movement of contracting for next year are vanishing, and it is uncertain what prices might develop if the market were thoroughly tested. A feature, however, is the very low ebb of stocks in all quarters.

There has been some buying of Forging Billets in the Chicago District, but otherwise the market is dull and easier. Practically nothing is doing in Standard Rails, while in Light Rails concessions of \$2 to \$3 per ton are being made in the effort to secure what little business is going. A moderate amount of new tonnage is being contracted for in Structural Material. In Chicago 1750 tons were placed for the University Club, and bids have gone in for various buildings which will call for upward of 10,000 tons.

The mills are catching up on Plates and Sheets, and in the case of the latter some concessions are being made. The Tin Plate trade is dull, and mills are being closed down. A decline is looked forward to by the trade, since there has been a drop in Pig Tin from over 45c. a pound to close to 30c. a pound.

The Wire trade stands forth as the one in which orders are still coming forward to the mills in almost undiminished volume.

The export trade holds well. The last report of the German Steel Syndicate, under date of October 10, is very emphatic on one point, which it will be well to keep in mind when considering the international situation. Reports have been current in England that German material has been offered in quantity in that market. The Steel Syndicate says: "It is out of the question, as is frequently reported, that our material is offered by dealers, since we operate in England only directly with consumers, and no dealer is in the position to sell even a pound of Syndicate material. In such cases it is usually only French or Belgian material."

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

Oct. 23, Oct. 16, Sept. 25, Oct. 24,
1907. 1907. 1907. 1906.

PIG IRON, Per Gross Ton:

Foundry No. 2, Standard, Philadelphia	\$19.75	\$20.00	\$20.25	\$21.50
Foundry No. 2, Southern, Cincinnati	20.75	21.25	21.75	20.50
Foundry No. 2 Local, Chicago	22.00	22.00	22.50	22.00
Bessemer, Pittsburgh	22.90	22.90	22.90	20.85
Gray Forge Pittsburgh	20.40	20.40	20.90	19.85
Lake Superior Charcoal, Chicago	26.00	26.00	26.50	22.00

BILLETS, &c., Per Gross Ton:

Bessemer Billets, Pittsburgh	28.00	28.00	29.50	28.00
Forging Billets, Pittsburgh	31.00	31.00	33.00	35.00
Open Hearth Billets, Philadelphia	30.00	31.00	31.00	32.00
Wire Rods, Pittsburgh	35.00	35.00	36.00	35.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL, Per Gross Ton:

Steel Rails, Melting, Chicago	16.00	16.25	17.00	18.50
Steel Rails, Melting, Philadelphia	15.25	16.25	16.75	18.50
Iron Rails, Chicago	26.00	20.25	20.25	26.50
Iron Rails, Philadelphia	20.50	20.50	20.50	25.50
Car Wheels, Chicago	24.50	24.50	24.50	20.00
Car Wheels Philadelphia	22.75	22.75	23.00	21.50
Heavy Steel Scrap, Pittsburgh	16.75	17.25	17.00	16.75
Heavy Steel Scrap, Chicago	14.50	15.00	14.75	16.50
Heavy Steel Scrap, Philadelphia	15.90	16.00	16.50	18.00

FINISHED IRON AND STEEL,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia	1.75	1.75	1.75	1.83½
Common Iron Bars, Chicago	1.78	1.78	1.78	1.71½
Common Iron Bars, Pittsburgh	1.70	1.70	1.70	1.60
Steel Bars, Tidewater, New York	1.81	1.81	1.81	1.64½
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.50
Tank Plates, Tidewater, New York	1.86	1.86	1.86	1.74½
Tank Plates, Pittsburgh	1.70	1.70	1.70	1.60
Beams, Tidewater, New York	1.86	1.86	1.86	1.84½
Beams, Pittsburgh	1.70	1.70	1.70	1.70
Angles, Tidewater, New York	1.86	1.86	1.86	1.84½
Angles, Pittsburgh	1.70	1.70	1.70	1.70
Skelp, Grooved Steel, Pittsburgh	1.85	1.85	1.85	1.57½
Skelp, Sheared Steel, Pittsburgh	1.95	1.95	1.95	1.60

SHEETS, NAILS AND WIRE,

Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	2.50	2.50	2.50	2.40
Wire Nails, Pittsburgh	2.05	2.05	2.05	1.85
Cut Nails, Pittsburgh	2.05	2.05	2.10	1.90
Barb Wire, Galv., Pittsburgh	2.50	2.50	2.50	2.30

METALS, Per Pound:

	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	12.50	13.25	15.00	22.25
Electrolytic Copper, New York	12.12½	12.87½	14.75	22.00
Spelter, New York	5.50	5.55	5.25	6.30
Spelter, St. Louis	5.35	5.35	5.15	6.20
Lead, New York	4.60	4.65	4.75	5.90
Lead, St. Louis	4.50	4.50	4.55	5.90
Tin, New York	30.75	31.20	37.15	43.25
Antimony, Hallett, New York	11.00	11.00	11.00	25.00
Nickel, New York	45.00	45.00	45.00	45.00
Tin Plate, 100 lb., New York	\$4.09	\$4.09	\$4.09	\$3.94

Chicago.

FISHER BUILDING, October 23, 1907.—(By Telegraph.)

Developments of the week have apparently left the market without gain or loss in volume of business. There has certainly been no acceleration in demand, but in most lines specifications against contracts are coming in fast enough to meet all requirements. An aggregate of 10,000 of Structural Material, principally for building construction, is up for figures, and will probably be let within a few days. It is significant of confidence in a speedy readjustment of the present unsettled condition of affairs upon a firm and equitable basis that new projects in building and other enterprises keep on developing. Nothing has transpired to indicate what will be the final outcome of negotiations as to Standard Section Rails for the remainder of the 1908 requirements. A reduction of \$2 on the large and \$3 on the smaller sizes of Light Rails is announced. In other departments of finished material prices are unchanged, though in Sheets and Cast Iron Pipe some irregularity in quotations is observed. Wire goods continue active, the demand from the South and Southwest being especially strong. There is an utter lack of interest in Pig Iron on the part of buyers. Orders are not plentiful, and those being placed are of small tonnage and for nearby delivery. Scrap material is weaker with small prospect of any immediate reaction.

Pig Iron.—The prevailing quietness of the market is as yet unbroken by any active buying, either for present or future requirements. A little more inquiry has developed, however, but it is almost wholly confined to this year's deliveries. It is difficult to determine just how far these inquiries reflect the possible needs of melters for this period,

but there is a well defined feeling among the furnace interests that some fair sized tonnages will be required by at least a few large consumers before the year is out. Prices are nominally without change. While \$18 to \$18.50, Birmingham, is still maintained by the Southern furnaces, it is hardly likely that a firm offer of good tonnage would be turned down at even a strong shade below these figures. The situation in Northern Iron is not materially different, although it is conceded that some interests have but little surplus to offer on this year's schedules. The meager sales and small tonnage involved in current transactions furnish a basis for only nominal quotations. One large Malleable consumer thought to be in need of Iron for nearby delivery is reported to be testing the market. Southern shipments are in some cases not coming through as speedily as they should, which naturally revives apprehension of more serious trouble in transportation delays as the season advances. The following prices are for October, November and December delivery, f.o.b. Chicago:

Lake Superior Charcoal.....	\$26.00 to \$26.50
Northern Coke Foundry, No. 1.....	22.50 to 23.00
Northern Coke Foundry, No. 2.....	22.00 to 22.50
Northern Coke Foundry, No. 3.....	21.50 to 22.00
Northern Scotch, No. 1.....	23.00 to 23.50
Ohio Strong Softeners, No. 1.....	23.00 to 23.50
Ohio Strong Softeners, No. 2.....	22.50 to 23.00
Southern Coke, No. 1.....	22.85 to 23.35
Southern Coke, No. 2.....	22.35 to 22.85
Southern Coke, No. 3.....	21.85 to 22.35
Southern Coke, No. 4.....	21.35 to 21.85
Southern Coke, No. 1 Soft.....	22.85 to 23.35
Southern Coke, No. 2 Soft.....	22.35 to 22.85
Southern Gray Forge.....	20.35 to 20.85
Southern Mottled.....	20.35 to 20.85
Malleable Bessemer.....	22.50 to 23.00
Standard Bessemer.....	23.90 to 24.40
Jackson Co. and Kentucky Silvery, 6 %	30.40 to 30.90
Jackson Co. and Kentucky Silvery, 8 %	32.40 to 32.90
Jackson Co. and Kentucky Silvery, 10 %	34.40 to 34.90

(By Mail)

Billets and Rods.—Sales of Forging Billets have been made by Eastern manufacturers in good sized quantities at about \$32.50 delivered. Wire Rods continue unchanged at \$35 to \$37, Pittsburgh.

Rails and Track Supplies.—Beyond a few inquiries for small lots of Standard Section Rails there is no significant movement in the market. Nothing has developed that would indicate a purpose on part of the roads to hasten plans for the purchase of the large tonnage it is presumed they will require during the coming year. Competition for new business in Light Rails has resulted in an open reduction of \$2 to \$3 a ton on the various weight divisions. Buying is mainly confined to small orders, and it is possible that the appearance of a good-sized tonnage would bring out offers even shading quotations which are this week revised. We quote as follows: Angle Bars, accompanying Rail orders, 1907 delivery, 1.65c.; car lots, 1.75c. to 1.85c.; Spikes, 2c. to 2.10c., according to delivery; Track Bolts, 2.50c. to 2.60c., base, Square Nuts, and 2.65c. to 2.75c., base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 25 to 45 lb. sections, \$32; 20-lb., \$33; 16-lb., \$34; 12-lb., \$35, f.o.b. mill. Standard Sections, \$28, f.o.b. mill, full freight to destination.

Structural Material.—There is nothing in the week's transactions to indicate any radical change in the situation, though there is a strong probability that some important pending projects are approaching the closure stage. A contract covering 1783 tons of material for the University Club Building, for which the Geo. A. Fuller Company is general contractor, was let to the Brown-Ketcham Iron Works, Indianapolis. Bids on revised specifications for the new Auditorium at Milwaukee are being opened to-day; at a former letting the bids so far exceeded estimates that all were rejected and a revision of plans was ordered, which resulted in scaling down the Structural Material from about 1800 to 1000 tons. The Commonwealth-Edison Company is also taking bids on 5000 tons for the construction of an addition to its Fisk street plant, work on which, it is understood, will proceed without delay. Contracts for 740 tons for the Postal Telegraph Building and 1243 tons for the Mont Leone Hotel, New Orleans, are up this week for decision. Altogether there are nearly 10,000 tons of material in these and minor enterprises, which seem reasonably sure of early closure. Mill specifications continue to come in freely. Prices from store are quoted without change, at 2.05c. to 2.10c., and mill prices at Chicago are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.88c.; Angles, 3 to 6 in., 1/4-in. and heavier, 1.88c.; larger than 6 in. on one or both legs, 1.98c.; Beams, larger than 15 in., 1.98c.; Zees, 3 in. and over, 1.88c.; Tees, 3 in. and over, 1.93c., in addition to the usual extras.

Plates.—New business is limited to orders for prompt requirements, which are neither individually nor collectively large. Buyers are not disposed to anticipate future needs to the extent of placing forward contracts. The feeling prevails that but little difficulty will be experienced after the turn of the year in getting reasonably prompt deliveries, and the need for present action is, therefore, not urgent. Notwithstanding the present firmness of the market, there is

also the feeling that lower prices will rule later on. We quote for future delivery as follows: Tank Plates, 1/4-in. and heavier, wider than 6 1/4 and up to 100 in. wide, inclusive, car lots, Chicago, 1.88c. to 2.08c.; 3-16 in., 1.98c. to 2.18c.; Nos. 7 and 8 gauge, 2.03c. to 2.23c.; No. 9, 2.13c. to 2.33c.; Flange quality, in widths up to 100 in., 1.98c. to 2.08c., base, for 1/4-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.98c. to 2.18c.; Flange quality, 2.08c. Store prices on Plates are as follows: Tank Plates, 1/4-in. and heavier, up to 72 in. wide, 2.20c. to 2.30c.; from 72 to 96 in. wide, 2.30c. to 2.40c.; 3-16 in. up to 60 in. wide, 2.30c. to 2.40c.; 72 in. wide, 2.50c. to 2.65c.; No. 8, up to 60 in. wide, 2.35c. to 2.45c.; Flange and Head quality, 0.25c. extra.

Sheets.—The volume of new business coming in, while only moderate, holds pretty even. As in other mill products, the demand is for immediate requirements, and in consequence the orders, though fairly numerous, are for small tonnage lots. There is still evidence of some irregularity in prices, which is chiefly manifested in a disposition on the part of some mills to make slight concessions from current quotations to secure desirable business. We quote mill shipments as follows, Chicago: Blue Annealed, No. 10, 2.03c.; No. 12, 2.08c.; No. 14, 2.13c.; No. 16, 2.23c.; Box Annealed, Nos. 17 to 21, 2.53c.; Nos. 22 to 24, 2.58c.; Nos. 25 to 26, 2.63c.; No. 27, 2.68c.; No. 28, 2.78c.; No. 29, 2.88c.; No. 30, 2.98c.; Galvanized Sheets, Nos. 10 to 14, 2.83c.; Nos. 15 and 16, 3.03c.; Nos. 17 to 21, 3.18c.; Nos. 22 to 24, 3.33c.; Nos. 25 and 26, 3.53c.; No. 27, 3.73c.; No. 28, 3.93c.; No. 30, 4.43c. Sheets from store: Blue Annealed, No. 10, 2.30c.; No. 12, 2.35c.; No. 14, 2.40c.; No. 16, 2.50c.; Box Annealed, Nos. 18 to 21, 2.70c.; Nos. 22 to 24, 2.75c.; No. 26, 2.80c.; No. 27, 2.85c.; No. 28, 2.95c.; No. 30, 3.35c.; Galvanized from store: Nos. 10 to 20, 3.15c. to 3.25c.; Nos. 22 to 24, 3.50c. to 3.55c.; No. 26, 3.60c. to 3.65c.; No. 27, 3.80c. to 3.95c.; No. 28, 4.10c.; No. 30, 4.60c. to 4.65c.

Bars.—Nothing of importance in the way of tonnage has developed in the week's transactions. New business is light, though specifications are coming in at a satisfactory rate. Bar Iron is quiet, but in the main prices are fairly steady. Quotations, Chicago, are as follows: Steel Bars, 1.78c., with half extras; Iron Bars, 1.78c.; Hoops, 2.18c., extras as per Hoop card; Bands, 1.78c., as per Bar card, half extras; Soft Steel Angles and Shapes, 1.88c., half extras. Store prices are as follows: Bar Iron 2.10c. to 2.25c.; Steel Bars, 2c to 2.10c.; Steel Bands, 2c., as per Bar card, half extras; Soft Steel Hoops, 2.35c. to 2.45c., full extras.

Merchant Pipe.—Because of the long delays in delivery occasioned by the overcrowding of mill capacities earlier in the year, buyers generally placed contracts further ahead than usual. Shipments against the earlier of these contracts have now been completed, and the better demand, which has developed within the past week, is ascribed in part to this cause. Orders at the present time are usually for prompt delivery. The following mill discounts are quoted: Black Pipe, 3/4 to 6 in., 71.2; 7 to 12 in., 68.2; Galvanized, 3/4 to 6 in., 61.2. These discounts are subject to 1 point on the base. From store in small lots Chicago jobbers quote 68 per cent. on Black Steel Pipe, 3/4 to 6 in. About 4 points advance above these prices is asked for Iron Pipe.

Boiler Tubes.—No special activity is noted, either in Locomotive or Merchant Tubes, but as a whole the demand for both is fair. Prompter service in mill shipments has somewhat lessened the volume of business from warehouse stocks. A reasonably active trade is, however, reported by jobbers. Mill quotations for future delivery on the base sizes are as follows: 2 3/8 to 5 in., in carload lots, Steel Tubes, 63.2; Iron, 50.2; Seamless, 49.2; 2 1/2 in. and smaller, and lengths over 18 ft., and 2 1/2 in. and larger, and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to 1 1/4 in.....	35	35	35
1 1/4 to 2 1/4 in.....	50	35	35
2 1/4 in.....	52 1/2	35	35
2 1/2 to 5 in.....	60	47 1/2	47 1/2
6 in. and larger.....	50	35	..

Merchant Steel.—With liberal contracts in hand covering consumers' requirements for the season, no movement of special note is expected at this time. The usual amount of filling in orders are being received, but beyond this there is nothing of market interest developing. Quotations are as follows: Planished or Smooth Finished Tire Steel, 1.98c.; Iron Finish up to 1 1/2 x 1/2 in., 1.93c.; Iron Finish, 1 1/2 x 1/2 in. and larger, 1.78c., base; Channels for solid Rubber Tires, 3/4 to 1 in., 2.28c., and 1 1/4 in. and larger, 2.18c.; Smooth Finished Machinery Steel, 2.18c.; Flat Sleigh Shoe, 1.93c.; Concave and Convex Sleigh Shoe, 2.08c.; Cutter Shoe, 2.46 1/4c.; Toe Calk Steel, 2.33c.; Railroad Spring, 1.98c.; Crucible Tool Steel, 7 1/4c. to 8c., and still higher prices are asked on special grades. Shafting, 54 per cent. off in car lots; 48 per cent., less than car lots, base territory delivery.

Cast Iron Pipe.—The market continues quiet, with no large inquiries or lettings of importance in sight. Tight money and the expectation of lower prices co-operate to

restrict trade. Prices are somewhat uneven and would doubtless be shaded to secure desirable tonnage. The contract for approximately 500 tons let last week by the city of Ashland, Ohio, was taken by the Massillon Iron & Steel Company. We quote, per net ton, Chicago, as follows: Water Pipe, 4-in., \$37; 6 to 12 in., \$36; 16-in. and up, \$35, with \$1 extra for Gas Pipe.

Coke.—Only a moderate demand exists for prompt delivery, but a number of inquiries for delivery through the first quarter are coming in. Prices are firm, at \$3.25 to \$3.50, at ovens, for 72-hr. Connellsville Coke.

Old Material.—The continued refusal of buyers to take on tonnage at ruling prices has exerted a depressing influence on the market, which is off about 50c. a ton on the principal grades. Little is being done in transactions for forward delivery, hand to mouth buying being the rule. Consumers generally are influenced by a belief in future recessions, and are in consequence buying sparingly. A list offered by the Chicago, Burlington & Quincy comprising 3000 tons is the only one out for closure this week. Inasmuch as this market will naturally be expected to absorb the bulk of this tonnage, a decisive test of its strength will be afforded. We quote, per gross ton, f.o.b. Chicago, as follows:

Old Iron Rails.....	\$20.00 to \$20.50
Old Steel Rails, rerolled.....	17.00 to 17.50
Old Steel Rails, less than 3 ft.....	16.00 to 17.00
Relaying Rails, standard sections, subject to inspection.....	26.00 to 28.00
Old Car Wheels.....	24.50 to 25.00
Heavy Melting Steel Scrap.....	14.50 to 15.00
Frogs, Switches and Guards, cut apart.....	15.00 to 15.50
Mixed Steel.....	11.00 to 11.50

The following quotations are per net ton:

Iron Fish Plates.....	\$17.00 to \$17.50
Iron Car Axles.....	23.00 to 23.50
Steel Car Axles.....	20.00 to 20.50
No. 1 Railroad Wrought.....	14.25 to 14.75
No. 2 Railroad Wrought.....	13.25 to 13.75
Railway Springs.....	14.00 to 14.50
Locomotive Tires, smooth.....	17.50 to 18.00
No. 1 Dealers' Forge.....	12.00 to 12.50
Mixed Bushing.....	10.00 to 10.50
Iron Axle Turnings.....	10.00 to 10.50
Soft Steel Axle Turnings.....	10.00 to 10.50
Machine Shop Turnings.....	10.00 to 10.50
Cast Borings.....	8.50 to 9.00
Mixed Borings, &c.....	8.50 to 9.00
No. 1 Mill.....	9.00 to 9.50
No. 2 Mill.....	8.00 to 8.50
No. 1 Boilers, cut to Sheets and Rings.....	10.50 to 11.00
No. 1 Cast Scrap.....	16.00 to 16.50
Stove Plate and Light Cast Scrap.....	14.00 to 14.50
Railroad Malleable.....	15.00 to 15.50
Agricultural Malleable.....	14.00 to 14.50
Pipes and Flues.....	11.00 to 11.50

Metals.—Recent speculative developments affecting Copper interests have reacted unfavorably on the Metal market, with the result that a further decline in Copper is recorded. Neither dealers nor consumers are optimistic in their views of the stability of values, even at the present level. With stocks generally much reduced, there is a fair demand for small lots for immediate use. Consumers are, however, not inclined to contract for forward delivery. Old Metals are lower, with a limited demand. We quote as follows: Casting Copper, 14c.; Lake, 15c. to 15½c., in car lots for prompt shipment; small lots, ¼c. to ¾c. higher; Pig Tin, car lots, 34¼c.; small lots, 34¾c.; Lead, Desilverized, 5c. to 5.10c., for 50-ton lots; Corroding, 6c. to 6.10c., for 50-ton lots; in car lots, 2¼c. per 100 lb. higher; Spelter, 5.65c.; Cookson's Antimony, 13c., and other grades, 12c. to 12½c.; Sheet Zinc is \$7.50 list f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 13½c.; Heavy Copper, 13½c.; Copper Bottoms, 12c.; Copper Clips, 12c.; Red Brass, 12c.; Yellow Brass, 10c.; Light Brass, 6¾c.; Lead Pipe, 5c.; Zinc, 4½c.; Pewter, No. 1, 21c.; Tin Foil, 25c.; Block Tin Pipe, 27c.

Birmingham.

BIRMINGHAM, ALA., October 21, 1907.

Pig Iron.—So far as actual sales are concerned there has been no change in the market for the past three or four weeks. The small amount of buying reported is only what melters require for immediate consumption. No contracts covering the remainder of the quarter or for delivery during next year have been placed here for several weeks. It is now pretty generally conceded by well posted Iron men that the long expected buying movement will not materialize this year. Several reasons are assigned for this. For more than a year melters have had great difficulty in securing the Iron bought, and to overcome this many have contracted for a great deal more than their actual requirements. During the third quarter deliveries became much easier and at the beginning of this quarter many consumers found themselves with plenty of Iron contracted for to last practically the balance of the year, which should have been delivered previously. Then, too, many melters in this district who contracted for Iron for the entire year have either closed down entirely or have curtailed production, and are offering their surplus at much lower than furnace prices. Several thousand tons additional resale Iron was placed on the market

this week. In order to maintain prices in the South the furnaces here have refused to meet competition in other territory, and as a result there will likely be more Iron for sale during the next two months than has heretofore been figured on. Just how long the operators will be able to maintain the established price of \$18.50 is problematical, but the chances are that with the present stringency in the money market few furnaces will be able to carry long stocks. Lower grades have suffered a still further decline this week, and \$15.25 for No. 4 Foundry could probably be done. Resale No. 2 Soft is quoted at \$17.50 in small lots, and a firm offer for a respectable tonnage at lower figures would no doubt be accepted.

Cast Iron Pipe.—Pine Bluff, Ark., is soon to place an order for 1200 tons, and several towns in Nebraska and Kansas will be in the market in the near future. The Pipe people are more encouraged over the outlook. Revised quotations on Water Pipe are approximately as follows, per net ton, f.o.b. cars here: 4 to 6 in., \$34; 8 to 12 in., \$33, over 12-in., average \$30, with \$1 per ton extra for Gas Pipe. On large municipal contracts these prices are probably slightly shaded.

Old Material.—The demand for Cast Scrap is very limited and prices have been reduced accordingly. Wrought continues in fair demand, though consumers are only buying for current requirements, refusing to make any contracts for future delivery. Stocks on dealers' yards are small. Quotations are about as follows, per gross ton, f.o.b. cars here:

Old Iron Rails.....	\$22.00 to \$22.50
Old Iron Axles.....	18.50 to 19.00
Old Steel Axles.....	17.00 to 17.50
Old Car Wheels.....	20.50 to 21.00
No. 1 Railroad Wrought.....	17.50 to 18.00
No. 2 Railroad Wrought.....	13.00 to 13.50
No. 1 Country Wrought.....	14.50 to 15.00
No. 2 Country Wrought.....	12.00 to 12.50
Wrought Pipes and Flues.....	13.00 to 13.50
Railroad Malleable.....	14.00 to 14.50
No. 1 Steel.....	14.00 to 14.50
No. 1 Machinery Cast.....	14.50 to 15.00
Stove Plate and Light Cast.....	10.50 to 11.00
Cast Borings.....	8.00 to 8.50

Philadelphia.

PHILADELPHIA, PA., October 22, 1907.

The market for Pig Iron and Finished Materials has been very dull the past week, in some cases scarcely enough business being transacted to make a market. The demand has been altogether of a day to day character, and the tonnages taken have been small. Prices on the whole cannot be said to be strong, and there is still some doubt expressed as to the stability of the present level. While the quotable range, particularly for Pig Iron, is not as wide as it was some weeks ago, there is still a tendency apparent on the part of sellers who need business to shade quotations a bit if a desirable tonnage should be offered. The same condition is to be noted in the finished material market, although not as pronounced. In some few classes of finished materials, however, prices are being fairly well maintained, while in others some concessions on the usual market prices can be had if the order is large enough and the specifications are desirable. Finished and semi-finished material mills as a rule are not working up to their full tonnage. In some cases the lull in business is being taken advantage of to make needed repairs, while in other cases there is not enough business in hand to keep the full capacity occupied. Financial conditions continue to hamper the trade to a considerable extent, and while the influence of the stock market has been depressing during the past week, its effect except as a factor in financial matters cannot be said to have been very extensive. It has no doubt brought about conservatism on the part of manufacturers to a greater extent, and the tendency to place orders for immediate needs only has been pronounced. What can be expected in the future is hard to foresee. Buyers are inclined to wait a while to see what turns up before taking hold heavily. For the same reason there is practically nothing being done regarding materials for next year's delivery, although there has been some little inquiry, no doubt with a view of feeling the market.

Pig Iron.—Sales of Pig Iron have been light, the week's business being the smallest probably in aggregate tonnage that has been done for some little time. What little business there was done was confined almost entirely to the foundry grades, and these were taken in small lots only. Buyers are strongly inclined to hold off awaiting further developments. Mills in some cases are fairly well stocked up with Pig Iron, and if the present state of the market continues will not be able to use anything like the tonnage still due them on contracts for this year. Melters who have not contracted for their last quarter's supply, which includes a good proportion of the foundries, are buying only enough Iron to supply their immediate needs and carload shipments predominate. The only good feature that the trade can see in this class of business is the fact that stocks in such cases are not large and that a fair volume of business can be expected to come out from week to week until conditions assume more definite shape. Producers in some cases are not as fully covered as

they would like for the balance of the year, and as some are rather anxious to take on more business, the possibility of shading prices in some directions is fully explained. In certain instances furnaces still have a good share of high-priced contracts on their books, and while some new business may be taken at figures which are pretty close to cost, they average up pretty well with the business already in hand. At the regular monthly meeting of the Eastern Pig Iron Association, held in this city last week, producers expressed themselves as being pretty well satisfied with the situation. Stocks on furnace banks were reported low, and there was but little curtailment of shipments. The bulk of the new business coming in was for prompt delivery, and it was thought that there would be no necessity for curtailment of production for curtailment's sake alone. That production would be decreased was certain, and a number of stacks will go out for repairs, both in the Schuylkill and Lehigh valleys, before cold weather sets in. Prices of Pig Iron show little actual change, principally due to lack of sales. No. 2 X Foundry, of which grade sales were by far the most numerous, has been sold in varying tonnages from \$19.75 to \$20.50, delivered. Most of the business was in small lots, ranging from carloads up to 200 to 300 tons, all of which was for early delivery. There has been some further inquiry for this grade of Iron, but little business has been done, as buyers believe that it will be possible to shade prices still further on a firm offer of a desirable tonnage. Basic Iron has been particularly quiet. Some of the mills are fully covered while others are not yet ready to buy. Meanwhile quotations are nominal, although it is believed that \$18.25, delivered, could readily be done. There has been some inquiry for Forge Irons, but little business has resulted. Sales have been confined to small lots, and prices are unchanged at \$18 to \$18.50, delivered. Low Phosphorus has been very quiet, no sales being reported. Virginia No. 2 X Foundry is still held by sellers at \$22, delivered, but no business is being done. It is believed, however, that this price would be materially cut if a firm offer came out. While there have been some few inquiries around for Iron for next year's delivery, there has been no business of any moment. Buyers hold out for lower prices, which sellers are unwilling to meet, so that for the time both sides have adopted a waiting policy. Prices for delivery in buyers' yards, eastern Pennsylvania and adjoining territory, for the remainder of the year, range about as follows:

No. 2 X Foundry.....	\$19.75 to \$20.50
Gray Forge.....	18.00 to 18.50
Basic.....	18.25 to 18.50
Low Phosphorus.....	27.00 to 27.50

Ferromanganese.—The demand for Ferro has been very quiet. Prices remain unchanged, \$56 to \$57 being quoted for deliveries during the remainder of the year, while \$54 to \$55 has been named for deliveries during the first half of next year.

Steel.—Sales have been confined to small lots, and prices have been reduced, but do not attract large business. Buyers continue to place orders for small quantities only, and mills are not very fully engaged. Prices are quoted at \$30 to \$31 for ordinary Rolling Steel, and \$33 to \$35.50 for Forging Steel.

Plates.—The demand is irregular. There is only a fair tonnage of new business coming out. Specifications are not large, and consumers are ordering only for their immediate needs. Prices remain unchanged, but slightly lower figures would no doubt be named for desirable business. Meanwhile, the following quotations are current:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel.....	1.85	1.90
Flange or Boiler Steel.....	1.95	2.05
Marine.....	2.20	2.25
Locomotive Firebox Steel.....	2.40	2.45
The above are base prices for ¼-in. and heavier. extras apply:		
3-16-in. thick.....	\$0.10	
Nos. 7 and 8, B. W. G.....	.15	
No. 9, B. W. G.....	.25	
Plates over 100 to 110 in.....	.05	
Plates over 110 to 115 in.....	.10	
Plates over 115 to 120 in.....	.15	
Plates over 120 to 125 in.....	.25	
Plates over 125 to 130 in.....	.50	
Plates over 130 in.....	1.00	

Structural Material.—Conditions continue much the same. There is still an absence of any heavy individual business, although the daily orders of a miscellaneous character keep mills pretty fully occupied. Prompt deliveries can be had as a rule, and prices are unchanged, at 1.85c. to 2c., according to specification.

Sheets.—There is a fair run of business and mills are somewhat better fixed than they were last week. Most of the orders are small and business comes out rather spasmodically, but there is sufficient in the aggregate to keep mills pretty fully occupied. Prices for mill shipments are as follows, a tenth extra being quoted for small lots: Nos. 18 to 20, 2.80c.; Nos. 22 to 24, 2.90c.; Nos. 25 to 26, 3c.; No. 27, 3.10c., and No. 28, 3.20c.

Bars.—The demand is extremely dull. New orders are

not coming out and specifications against old contracts are light. Mills are consequently not very active. Prices are quoted at 1.75c. to 1.80c., but are not strong. Steel Bars are quoted at 1.85c., with deliveries reported somewhat easier.

Old Material.—The market is weak and business is dull. It looks like lower prices in the leading grades and mills are taking only small lots for spot delivery. Bids and offers for deliveries in buyers' yards for early shipments are quoted about as follows:

Old Steel Rails and Crops.....	\$15.25 to \$15.75
No. 1 Steel Scrap.....	15.00 to 15.50
Low Phosphorus.....	20.00 to 21.00
Old Steel Axles.....	20.00 to 20.50
Old Iron Axles.....	27.50 to 28.50
Old Iron Rails.....	20.50 to 21.00
Old Car Wheels.....	22.75 to 23.25
Choice No. 1 R. R. Wrought.....	17.00 to 17.50
Machinery Cast.....	17.00 to 17.50
Wrought Iron Pipe.....	14.00 to 14.50
No. 1 Forge Fire Scrap.....	13.25 to 13.75
No. 2 Light Iron.....	9.50 to 10.00
Wrought Turnings.....	12.25 to 12.75
Stove Plate.....	14.50 to 15.00
Cast Borings.....	10.50 to 11.00
Grate Bars.....	14.00 to 14.50
No. 2 Light Sheet Steel.....	11.50 to 12.00

Miller, Foster & Co., 1033 Real Estate Trust Building, Philadelphia, Pa., have been appointed exclusive agents for the sale of Bar Iron manufactured by the Susquehanna Iron Company, Columbia, Pa., in southern New Jersey, Pennsylvania and the Southern States territory. They will also handle the company's line of Wrought Iron Pipe.

The Phillips Tool Steel Company, Pennsylvania Building, Philadelphia, Pa., has incorporated to take over the tool steel and drill business of F. R. Phillips & Sons Company. The new company will not manufacture, but will sell exclusively the product of Walter Spencer & Co., Ltd., Sheffield, England, consisting of Velox high speed steel and testing drills. W. Vernon Phillips is president; E. D. Manley, Jr., vice-president, and F. Rees Phillips, secretary and treasurer.

Pittsburgh.

PARK BUILDING, October 23, 1907.—(By Telegraph.)

Pig Iron.—The closing of the Pittsburgh Stock Exchange to-day to prevent a possible panic over the appointment of receivers for the Westinghouse Electric & Mfg. Company, Westinghouse Machine Company, and the Nernat Lamp Company, is bound to increase greatly the general uneasiness as to the future. The Electric and Machine companies are large buyers of Foundry Iron. It is not known whether any of the furnace companies are large creditors, but it is not believed that any of the concerns selling Pig Iron to the Westinghouse interests will be seriously affected. The Pig Iron market is nearly stagnant as far as sales are concerned, and outside of Bessemer the prices on all grades are weak. Bessemer is still nominally held at \$22, at furnace, but none is being sold. There have been sales of 3000 to 4000 tons of Basic on the basis of about \$19.50, Valley furnace. Nothing is doing in Foundry Iron except small lots for spot shipment which bring about \$21 at furnace for forward delivery. Northern No. 2 Foundry could be bought readily at \$19.50, Valley furnace, and it is probable that \$19 could be done on a firm offer in view of the recent unfavorable financial developments. Northern Forge is nominally \$19.50, Valley furnace, but if any business were offering this price would be materially shaded.

Steel.—The market continues weak and very dull. The Bellaire Works of the Carnegie Steel Company at Bellaire, Ohio, has closed down for an indefinite period. We quote Bessemer Billets at \$28, and Open Hearth at \$29, Pittsburgh. If any large tonnage was offering it is probable these prices would be shaded. Forging Billets are held at about \$31, but on a firm offer and for large tonnage, it is probable that \$30 could be done. Sheet and Tin Bars are firm at \$30, maker's mill, for this quarter delivery, but in view of the serious decline in prices of Billets it is probable that prices of Sheet and Tin Bars for first quarter of next year will be lower than for this quarter.

(By Mail.)

Aside from an official reduction of \$2 a ton in prices of Light Rails, to meet the competition of mills rerolling Rails, the week has been without special feature. The downward course of the stock market in the last few days, the trouble among important banks in New York and elsewhere, and reports of financial troubles existing among some other leading institutions, have done much to increase the unrest as to the future of the Steel trade, and present conditions are far from satisfactory. Buying is almost stagnant, consumers refusing to place orders except for such material as they absolutely need. Improvement in the Iron trade cannot be expected, and will not come, until the financial condition has

been cleared up and confidence at least partially restored. On such materials as Plates, Structural Shapes, Sheets, Tin Plate, Bars and Pipe the mills are running largely against contracts on which specifications are coming in at a fairly satisfactory rate. Unless, however, there is a material improvement in new business in these products between now and January 1, it would not be surprising if some radical reductions in prices were made. Tin Plate is extremely dull, leading mills not running to more than 50 per cent. of their capacity, with but little business booked ahead. A notable exception to the existing conditions in the above lines is that of the Wire industry, the mills being pushed to their utmost to get out material as fast as it is wanted by consumers. It is not unlikely that an early advance will be made in the price of Fence Wire and possibly Wire Nails, the demand for the former being enormously heavy. There is practically nothing doing in Pig Iron, and prices on all kinds, with the possible single exception of Bessemer, are weak and give every evidence of going lower. Practically no Pig Iron has been sold for next year's delivery, and the furnaces are getting anxious to have some tonnage on their books. The Steel market is dull and weak, Bessemer Billets being, nominally, \$28, and Open Hearth \$29. The supply of Open Hearth Billets is larger than that of Bessemer, and within a short time prices on Open Hearth will likely be side by side with Bessemer, or possibly lower. The Scrap market is somewhat demoralized. Coke is steady, but there has been nothing done in contracts for next year, the ideas of the furnaces and Coke makers being widely apart.

Ferromanganese.—In sympathy with other lines of raw materials, prices on Ferro are weak and the demand is dull. We quote 80 per cent. foreign Ferro for prompt delivery at \$53, Baltimore, or \$54.92, Pittsburgh, but on a firm offer for any considerable tonnage this price would likely be shaded.

Muck Bar.—There is practically no demand, and prices are only fairly firm. We quote best grades of Muck Bar made from all Pig Iron at \$35, Pittsburgh, but this price might be shaded if any large business was offering.

Skelp.—New demand is quiet, but the mills are pretty well filled on contracts against which buyers are specifying quite freely. We quote: Grooved Steel Skelp, 1.85c. to 1.90c.; Sheared Steel Skelp, 1.95c. to 2c.; Grooved Iron Skelp, 2.15c. to 2.20c., and Sheared Iron Skelp, 2.25c. to 2.40c., depending on sizes and widths. All these prices are f.o.b. maker's mill.

Rods.—The activity in the Wire trade is promptly taking up the available supply of Rods and prices are holding firm. We quote Bessemer Rods at about \$35 and Open Hearth \$36 to \$36.50, Pittsburgh.

Plates.—While a good deal of tonnage in Plates is pending, financial conditions are such that this work cannot be placed, and it will not be given out until the money market improves. A very small amount of new business is being placed, the mills running mostly on specifications against contracts which are coming in quite freely. Reports are that prices of Plates have been shaded recently in some cases. We quote: Tank Plates, ¼-in. thick, 6¼ in. up to 100 in. wide, 1.70c. base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than ¼-in. to and including 3-16-in.	
Plates on thin edges.....	\$0.10
Gauges Nos. 7 and 8.....	.15
Gauge No. 9.....	.25
Plates over 100 to 110 in.....	.05
Plates over 110 to 115 in.....	.10
Plates over 115 to 120 in.....	.15
Plates over 120 to 125 in.....	.25
Plates over 125 to 130 in.....	.50
Plates over 130 in.....	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.).....	.10
Complete Circles.....	.20
Boiler and Flange Steel Plates.....	.10
"A. B. M. A." and ordinary Firebox Steel Plates..	.20
Still Bottom Steel.....	.30
Marine Steel.....	.40
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Rails.—The Carnegie Steel Company has made a reduction of \$2 a ton in prices of Light Rails to meet the competition of mills that are rerolling Rails, and we now quote as follows: 25 to 45 lb., \$30; 20 lb., \$31; 16 lb., \$32; 12 lb., \$34; 10 lb., \$36, and 8 lb., \$40. The matter of Rail specifications is in abeyance and will be until after the meeting of the Railway Association to be held in New York, October 31, but it is not expected there will be any heavy buying movement in Rails, even should the matter of specifications be settled, until there is decided improvement in the money situation. Railroads find it impossible to get money at reasonable rates of interest, and will not place contracts for Rails or other equipment while this condition lasts. The Carnegie Steel Company entered orders in the past week for about 6000 tons of Standard Sections subject to present specifications. We quote Standard Sections at \$28 at mill,

and Angle Splice Bars at 1.65c. at mill. Deliveries on some Rail contracts have been held up by the mills, owing to the buyers not being able to make satisfactory arrangements to pay for them.

Structural Material.—Structural concerns report the present condition as very quiet, a large amount of work being held up or postponed until next year on account of the tight money market. The largest local job in sight is that of the new Pittsburgh & Lake Erie bridge, at Beaver, Pa., preliminary bids for which have gone in. This is to be a three-track structure and will take from 12,000 to 15,000 tons of Steel. The mills are now making better deliveries on Shapes than for some time past, having pretty well caught up on back orders. We quote: Beams and Channels, up to 15 in., 1.70c.; over 15 in., 1.80c.; Angles, 3 x 2 x ¼ in. thick, up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3½ in., 1.80c.; Zees, 3 in. and larger, 1.70c.; Tees, 3 in. and larger, 1.75c.; Bulb Angles and Deck Beams, 2c. Under the Steel Bar card, Angles, Channels and Tees under 3 in. are 1.70c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Sheets.—Specifications against contracts continue to come in freely and shipments by the mills are heavy. New business, however, is light, and some of the Sheet mills have pretty well caught up on back orders, and are now seeking new business actively, with the result that prices are being shaded as much as \$2 a ton on both Black and Galvanized. Jobbers are also naming slightly lower prices for deliveries from store. Prices on Black and Galvanized Sheets, which are being shaded by some mills from \$1 to \$2 a ton, are as follows: Blue Annealed Sheets, No. 10 gauge and heavier, 1.85c.; Nos. 11 and 12, 1.90c.; Nos. 13 and 14, 1.95c.; Nos. 15 and 16, 2.05c.; Box Annealed, Nos. 17 to 21, \$2.35c.; Nos. 22 to 24, 2.40c.; Nos. 25 and 26, 2.45c.; No. 27, 2.50c.; No. 28, 2.60c.; No. 29, 2.75c.; No. 30, 2.85c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.65c.; Nos. 12 and 14, 2.75c.; Nos. 15 and 16, 2.85c.; Nos. 17 to 21, 3c.; Nos. 22 and 24, 3.15c.; Nos. 25 and 26, 3.35c.; No. 27, 3.55c.; No. 28, 3.75c.; No. 29, 4c., and No. 30, 4.25c. We quote No. 2 gauge Painted Roofing Sheets at \$1.85 per square, and Galvanized Roofing Sheets, No. 28 gauge, \$3.25 per square, for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances.

Tin Plate.—Present conditions in the Tin Plate trade are extremely unsatisfactory, the demand being dull, and the mills have very little tonnage ahead of them. The leading interest is operating only about 50 per cent. of its Tin Plate capacity, and most of the independents are likewise running at half capacity or less. Unless there is a material improvement in demand for Tin Plate before long there will have to be a further material restriction in output. There are reports that concessions have been offered to secure new business. We quote \$3.90 for 100-lb. Cokes, 14 x 20, f.o.b. Pittsburgh, terms 30 days, less 2 per cent. off for cash in 10 days, on which price a rebate of 5c. a box is allowed for carload and larger lots.

Bars.—A fair amount of new tonnage is being placed in Iron and Steel Bars, but the demand is widely scattered and is mostly for small lots. Consumers believe that unless general conditions soon improve prices on both Iron and Steel Bars may be lower, and with this in view they are placing orders cautiously. In view of the fact that the leading producers of Steel Bars are filled up for some months ahead, it hardly seems likely there will be any reduction in prices until this tonnage has been shipped out. We quote Steel Bars at 1.60c., base, Pittsburgh, and Iron Bars at 1.70c., Pittsburgh, for delivery in the Pittsburgh District, and 1.60c., Pittsburgh, for Western shipment.

Spelter.—The market is fairly steady, but the demand is quiet. We quote prime grades of Western Spelter at 5.35c., St. Louis, equal to 5.47½c., Pittsburgh.

Merchant Steel.—New business is light, but specifications on contracts are coming in at a fairly satisfactory rate. It is stated that heavy orders for Shafting were placed by large consumers prior to the recent adjustment in prices. We quote Cold Rolled Shafting at 54 per cent. off in large lots and 48 per cent. off in carload lots, delivered in base territory; Smooth Finished Machinery Steel, 1.85c. to 2c., depending on quality; Flat Sleigh Shoe, 1.65c. to 1.75c.; Cutter Shoe, 2.15c. to 2.20c.; Toe Calk Steel, 2.10c. to 2.15c.; Railroad Spring Steel, 1.75c. to 1.80c.; Crucible Tool Steel, 6c. to 8c. for ordinary grades, and 10c. and upward for special grades.

Railroad Spikes.—The demand for Railroad Spikes is almost stagnant, but for the smaller sizes is fairly active, and the mills are somewhat behind in deliveries. We quote standard sizes of Railroad Spikes at \$1.95 to \$2, and small sizes at \$2.10 to \$2.15 per 100 lb., f.o.b., Pittsburgh.

Merchant Pipe.—A moderate volume of new tonnage is being placed in Merchant Pipe, but the mills are catching up on back deliveries at a pretty rapid rate. The National Tube Company expects this month to break all previous records in output. Prices on Steel Pipe continue firm, but some concessions are being made in Iron Pipe. Should money conditions improve, it is believed that next year an enormous

tonnage will be wanted for gas and oil lines, as some very large projects are in view. Discounts on Steel Pipe are as follows:

	Merchant Pipe.	
	Jobbers, carloads.	Steel.
	Black.	Galv.
1/4 to 1/2 in.....	65	49
3/4 in.....	67	53
1/2 in.....	69	57
5/8 to 6 in.....	73	63
7 to 12 in.....	70	55
Extra strong, plain ends:		
1/4 to 3/4 in.....	58	46
1/2 to 4 in.....	65	53
4 1/2 to 8 in.....	61	49
Double extra strong, plain ends:		
1/2 to 8 in.....	54	43

To the large trade all above discounts are subject to 1 point on the base, and 5 per cent. on the net.

Official discounts on Iron Pipe, which are shaded 2 points or more to the large trade, are as follows, f.o.b. Pittsburgh:

	Standard Genuine Iron Pipe.	
	Black.	Galv.
	%	%
3/4 to 6 in.....	67	57
1/2 in.....	62	50
5/8 in.....	60	42
1/4 and 1/2 in.....	58	42
7 to 12 in.....	62	47
Extra Heavy Iron Pipe, Plain Ends.		
1/4, 1/2 and 3/4 in.....	62	40
1/2 to 4 in.....	59	47
4 1/2 to 8 in.....	55	42

Boiler Tubes.—There is very little buying in Railroad Tubes, but on such tonnage as is being placed some low prices are being made. Merchant Tubes are in fairly active demand, and prices are reasonably strong. Discounts on Merchant Tubes are as follows:

	Boiler Tubes.	
	Iron.	Steel.
1 to 1 1/2 in.....	42	47
1 1/2 to 2 1/4 in.....	42	59
2 1/4 in.....	47	61
2 1/2 to 5 in.....	52	65
6 to 13 in.....	42	59
2 1/2 in. and smaller, over 18 ft. long, 10 per cent. net extra.		
2 1/2 in. and larger, over 22 ft. long, 10 per cent. net extra.		

Iron and Steel Scrap.—Conditions in the Scrap trade are very far from being satisfactory to dealers, who find that consumers are willing to take in only what they absolutely need, with the result that sales are few and far between and are confined almost entirely to small lots. The tendency of prices is steadily downward. The Norfolk & Western and one or two other railroads have recently sold a considerable tonnage of Scrap at prices much lower than were obtained from previous sales. Dealers quote about as follows: Heavy Steel Scrap, \$16.75 to \$17; No. 1 Railroad Wrought Scrap, \$17 to \$17.25; No. 2 Wrought Scrap, \$16.50; Bundled Sheet Scrap, \$14.50 to \$14.75; Re-rolling Rails, \$16.75 to \$17.25; Cast Iron Borings, \$12.25 to \$12.50; No. 1 Cast Scrap, \$18.50 to \$18.75; Old Steel Rails, short pieces for open hearth use, \$16.75 to \$17; Low Phosphorus Melting Stock, \$20.50 to \$21; No. 1 Busheling Scrap, \$15.75 to \$16; No. 2, \$12.25 to \$12.50; Steel Axles, \$21.50; Old Car Wheels, \$23 to \$23.50; Standard Sheet Bar Crop Ends, \$19.50 to \$20; Stove Plate, \$14.50 to \$14.75, net ton; Grate Bars, \$15.50. All above prices are per gross ton, unless otherwise stated. We note sales of about 5000 tons of Re-rolling Rails made by three or four local dealers at prices equal to about \$17, Pittsburgh; 700 tons of Bundled Sheet Scrap at about \$14.50, gross ton, delivered at consuming points; 100 tons of Cast Scrap at \$18.50, Newark, Ohio, and 100 tons of Stove Plate at \$14.40, net ton, Pittsburgh.

Coke.—There is some inquiry from consumers of Furnace Coke on contracts for next year, but the ideas of the furnaces and makers of Coke as to prices are so far apart that as yet nothing has been done. In a number of cases \$3 a ton on Furnace Coke for first half of next year has been asked and turned down. Strictly Connellsville Furnace and other high grade Cokes for prompt shipment are held at \$2.90 to \$3 a ton at oven, and 72-hr. Foundry at \$3.25 to \$3.40 a ton, at oven. There is still a shortage of labor at some of the Coke plants in the Connellsville region, but the supply of cars is ample and shipments are heavy. The output of Coke in the Upper and Lower Connellsville regions last week amounted to 429,038 tons.

The Reinforced Brazing & Machine Company has removed its offices from 1109 Arrott Building to 2525 Liberty avenue, Pittsburgh, where its plant is located.

The report of the Texas State Railroad Commission for the year ending June 30, 1907, showed a total of 15,482 miles of railroad in Texas on that date. The statement in the report that but 31 miles of new railroad was built in the year carries its own comment on the fruits of legislation of the Texas type.

Cincinnati.

FIFTH AND MAIN STS., October 23, 1907.—(By Telegraph.)

Both factors concerned in the Pig Iron Market seem equally chary of contracts for 1908 business. Aside from a few cautious inquiries, nothing has resulted, and the tentative figures of \$17, Birmingham, for the first quarter must continue to do duty until something more substantial comes forward upon which to base a price. The inquiry on spot Iron is considerably better, but the reluctance of consumers to anticipate their wants for next year is as pronounced today as it was three weeks ago. In Finished Material there is a very general improvement, and dealers for the most part are optimistic. In Scrap there is a further weakness, consumers showing absolutely no interest. Reports from the Iron producing districts tend to show little surplus production over that booked on contracts, and it is not thought that there will be much carried into the new year. There is much dissatisfaction manifested by melters and manufacturers north of the Ohio River over what they term unreasonable freight charges, and a determined effort is to be made through the Receivers' and Shippers' associations to get the railroads to reduce the rate. A meeting scheduled to take place at Dayton, Ohio, November 7, will be attended by manufacturers and foundrymen from numerous cities, and addressed by the commissioners of the association. It is the general belief that the furnacemen will add the support of their moral influence.

Pig Iron.—There is a little improvement in inquiry, and one dealer is found whose gross sales for Monday totaled 675 tons in small lots, and this is regarded as the best single day's business for some time. The greater part of this was sold for November and December delivery. The expected break has occurred and the range for immediate delivery on Southern No. 2 is now \$17.50 to \$18, Birmingham, and \$20 at furnace on Northern No. 2, with little doing at these prices. A radiator manufacturer is in the market for 600 tons of spot Iron of certain specified high phosphorus, graded as No. 2 Southern, for which it is expected a special price will have to be paid. It is needed at once. The 4000-ton lot mentioned in our last report dwindled in the handling of the transaction to 500 tons, and this Iron, a Virginia product, belongs in the resale category and was probably an exchange or trade proposition. Northern Irons are generally reported a little weaker, and \$28 at furnace is considered a fair price for 8 per cent. silicon. One small lot of Southern No. 2 was sold under keen competition at \$17.25, and for spot delivery, and this is reported as a direct sale from furnace. Furnaces are reported as rushing Iron on contracts. That the melt in some of the more industrious centers is keeping up is evident by the call for Coke for spot delivery. For the remainder of 1907 we quote, f.o.b. Cincinnati, in which are figured the freight rate from Birmingham, \$3.25, and from the Hanging Rock District \$1.20, as follows:

Southern Coke, No. 1.....	\$21.25 to \$21.75
Southern Coke, No. 2.....	20.75 to 21.25
Southern Coke, No. 3.....	20.25 to 20.75
Southern Coke, No. 4.....	18.75 to 19.25
Southern Coke, No. 1 Soft.....	21.25 to 21.75
Southern Coke, No. 2 Soft.....	20.75 to 21.25
Southern Coke, Gray Forge.....	18.50 to 19.00
Southern Coke, Mottled.....	18.00 to 18.50
Ohio Silvery, 8 per cent. Silicon.....	20.20 to 20.70
Lake Superior Coke, No. 1.....	21.70 to 22.20
Lake Superior Coke, No. 2.....	21.20 to 21.70
Lake Superior Coke, No. 3.....	20.70 to 21.20

Car Wheel Irons.

Standard Southern Car Wheels.....	\$29.25 to \$29.75
Lake Superior Car Wheels.....	27.70 to 28.00

Coke.—There is evidently good consumption and prices are in the main firm. Virginia Foundry is held at \$3.25 and Furnace at \$2.75 to \$2.85 at oven; Connellsville Foundry \$3.25, Furnace \$2.90 to \$3. Troubles in scarcity of labor, car shortage, &c., are still the bugbear of the producers.

Finished Iron and Steel.—There is manifestly a general improvement in tone through jobbing channels. The demand for Bars is excellent and Sheets Nos. 10 to 16 are also active. The manufacturer who has usually hitherto supplied his needs in carload lots is buying in small lots and just as he needs the material. No special fault is found with deliveries from the mills on Iron, although there is still complaint that Steel orders placed months ago remain undelivered. Dealers quote, f.o.b. Cincinnati, as follows: Iron Bars, carload lots, 1.80c., with half extras; small lots from store, 1.90c., base, full extras; Steel Bars, carload lots, 1.75c., base, half extras; small lots from store, 1.90c., base, full extras; Base Angles, carload lots, 1.75c.; small lots from store, 2.10c.; Beams, Channels and Structural Angles, 1.85c., base; small lots from store, 2.10c.; Plates, 1/4-in. and heavier, carload lots, 1.95c.; small lots from store, 2.20c.; Sheets, No. 16, carload lots, 2.20c.; small lots from store, 2.50c.; No. 14, carload lots, 2.10c.; small lots from store, 2.40c.; Steel Tire, 4-in. or heavier, carload lots, 1.95c., base; Plates, 3-16 and No. 8, carload lots, 2c.; small lots from store, 2.25c.; Sheets, No. 10, 2c., carload lots; 2.30c. from store; Sheets, No. 12, 2.05c., carload lots; 2.40c. from store; Light Sheets, Black, No. 28, carload lots, 2.75c.; Galvanized, No. 28, 3.90c.

Old Material.—There is no activity in Scrap, and as some dealers express it, the bottom has fallen out of the market. Specifications are being prepared, however, for enlargements and improvement in some yards and warehouses, indicating a belief in better things in the future. Dealers quote, f.o.b. Cincinnati, about as follows:

No. 1 R. R. Wrought, net ton.....	\$14.00 to \$14.50
Cast Borings, net ton.....	8.00 to 8.50
Steel Turnings, net ton.....	8.50 to 9.00
No. 1 Cast Scrap, net ton.....	15.50 to 16.00
Burnt Cast and Wrought, net ton.....	8.50 to 9.00
Old Iron Axles, net ton.....	22.00 to 23.00
Old Iron Rails, gross ton.....	18.50 to 19.00
Old Steel Rails, long, gross ton.....	15.50 to 16.50
Relaying Rails, 56 lb. and up, gross ton.....	26.50 to 27.00
Old Car Wheels, gross ton.....	21.50 to 22.00
Mining Car Wheels, gross ton.....	11.50 to 12.50
Low Phosphorus Scrap, gross ton.....	18.00 to 18.50

New York.

NEW YORK, October 23, 1907.

Pig Iron.—There has been a moderate volume of business, and the market has remained steady. Buyers are proceeding very cautiously, while sellers are not pressing the market. There has been no indication thus far of any selling in this market of Virginia and Alabama Irons, nor have the Buffalo makers made any effort to place Iron. We quote Northern Iron, tidewater, \$21.25 to \$21.75 for No. 1 Foundry, \$19.75 to \$20.25 for No. 2 Foundry, and \$19.25 to \$19.50 for No. 2 Plain. Alabama Irons are quoted nominally, \$22.25 for No. 1 Foundry, and \$21.75 to \$22 for No. 2 Foundry.

Steel Rails.—An order for 3000 tons of Rails for a far Northwestern road was taken by the Chicago mill in the past week. Otherwise the week has been practically devoid of transactions and contracts for next year are likely to be postponed for some time. Cancellations of business on which delivery was to be made this year are of small proportions.

Structural Material.—The month promises to show the smallest total of business for the year and longer. Small jobs are as eagerly contested for as were large contracts a few months ago and the low prices of the summer have been cut in the competition of fabricating companies. The American Bridge Company has taken the contract for the Postal Telegraph Building at San Francisco—750 tons. The Hay Foundry & Machine Company has been awarded the fabrication of Steel for a loft building at Broadway and Franklin street requiring about 1500 tons; for the Fishel estate loft building, about 1200 tons; for the Fourth National Bank Building, 500 tons, and for a bridge for the Central Railroad of New Jersey at Newark. The railroad contracts of the past week have been for relatively small amounts—300 tons for the Norfolk & Western, taken by the Virginia Bridge & Iron Company; 150 tons for the Seaboard Air Line; several small bridges for the Erie, and 200 tons for a subway for the Chicago & Western Indiana. In New York City financial conditions have caused the laying aside of plans for considerable building, architects and engineers being advised by their principals in some cases that the work will be postponed indefinitely, or at least until the financial situation is clearer. The mills are making better deliveries; at the same time they are kept well employed. We quote mill shipments, tide-water deliveries, as follows: Beams, Channels, Angles, and Zees, 1.86c.; Tees, 1.91c. On Beams, 18 to 24 in., and Angles over 6 in., the extra is 0.10c. Sales out of stock, of material cut to length, are made at 2¼c. to 2½c.

Bars.—General conditions have not been favorable to much activity in any branch of business and orders for Bars have not been an exception to the rule. Notwithstanding the quiet condition of trade, the Eastern manufacturers who met in this city last week decided not to reduce prices, which continue on the basis of 1.60c., Pittsburgh, or 1.76c., tide-water, for Bar Iron. Steel Bars continue to be quoted at the same price for deferred delivery, while those able to make prompt shipments ask a slightly higher price.

Plates.—Sales agents report few orders. The outlook does not indicate an early resumption of active buying. Prices are quoted as follows for tidewater delivery: Sheared Tank Plates, 1.86c. to 1.96c.; Flange Plates, 1.96c. to 2.06c.; Marine Plates, 2.26c. to 2.36c.; Fire Box Plates, 2.75c. to 3.50c., according to specifications.

Cast Iron Pipe.—The only transaction which appears to have occurred in this vicinity during the week was the purchase of about 600 tons for improvements at Long Beach, Long Island. Inquiries are very light, and the trade evidently has a period of decided dullness in prospect. Carload lots of 6-in. are quoted at \$32.50 to \$33 per net ton at tide-water.

Old Material.—The market is dull and prices are lower. Little demand is noted for Rolling Mill Scrap, but some movement is taking place in Foundry stock. The demand for Stove Plate is sufficiently great to keep this class of material conspicuously firm. Some transactions have occurred in Steel Scrap. Certain classes of material, such as Borings

and Turnings, are absolutely neglected. Quotations per gross ton, New York City, are as follows:

Old Girder and T Rails for melting.....	\$12.00 to \$12.50
Heavy Melting Steel Scrap.....	12.00 to 12.50
Old Steel Rails, rerolling lengths.....	15.50 to 16.00
Relaying Rails.....	25.00 to 25.50
Old Iron Rails.....	20.00 to 20.50
Standard Hammered Iron Car Axles.....	24.00 to 25.00
Old Steel Car Axles.....	18.00 to 19.00
No. 1 Railroad Wrought.....	15.00 to 16.00
Iron Track Scrap.....	13.50 to 14.50
No. 1 Yard Wrought, long.....	14.00 to 14.50
No. 1 Yard Wrought, short.....	13.50 to 14.00
Light Iron.....	8.00 to 8.50
Cast Borings.....	8.50 to 9.00
Wrought Turnings.....	10.50 to 11.00
Wrought Pipe.....	10.50 to 11.00
Old Car Wheels.....	21.00 to 21.50
No. 1 Heavy Cast, broken up.....	15.50 to 16.00
Stove Plate.....	14.00 to 14.50
Grate Bars.....	12.00 to 12.50
Malleable Cast.....	15.00 to 16.00

H. V. De Hart and W. H. Stafford announce that they have entered into a partnership to carry on a business in a general line of Iron and Steel products, including Structural Steel, Billets, Plates, Bars, Malleable and Steel Castings, Light Rails, Planished Steel and Forgings, with headquarters at 29 Broadway, New York.

Cleveland.

CLEVELAND, OHIO, October 22, 1907.

Iron Ore.—Shipments from the upper lake ports are still heavy, and the October movement will be very satisfactory to the shippers. Some of them estimate that their shipments this month will not be over 10 per cent. below September. If the weather is fairly favorable, and the season does not close early, the total season's shipments, it is believed, will reach close to 41,000,000 tons. Little is heard now about an Ore shortage this year. A great deal of Ore is now being piled on Lake Erie docks. The Ore market is quiet, inquiries for Ore being scarce, but if any furnace wished to pick up a tonnage of any size it would be difficult to find. No interest appears to have been aroused as yet in next year's Ore, and it is believed that in view of the present uncertainty regarding next year's business conditions the buying movement will start later this year than it has for the past year or two. Prices are as follows at Lake Erie docks, per gross ton: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range Non-Bessemer, \$4.25; Mesaba Non-Bessemer, \$4; Siliceous Bessemer, \$2.75; Siliceous Non-Bessemer, \$2.35 to \$2.60.

Pig Iron.—There is less demand for Foundry Iron for prompt shipment, and the market is quieter than it has been for several weeks. While foundries are buying practically no Iron at present, the demand for Iron on contract is good and requests that shipment be withheld have practically disappeared. In some cases prompt deliveries are being urged by consumers. Foundries in this territory are well supplied with work and the majority of them are consuming more Iron than they were a month or two ago. Inquiries for Northern Foundry Iron for the first quarter and first half of 1908 are increasing, among those of the past week being one for 2000 tons. Many of the inquiries are believed, however, to be mainly for the purpose of testing the market. Furnaces prefer to wait, however, and some of the leading interests, in response to inquiries, have told the prospective buyers that they were not ready to make quotations. Outside of Foundry Iron the market is absolutely dead. Consumers of Basic Iron are urging prompt deliveries. Foundry Iron is somewhat weaker, \$21, at furnace, being the best local furnaces can get for small lots. Quotations for the balance of 1907, f.o.b. Cleveland, are as follows:

Bessemer.....	\$22.90
Northern Foundry, No. 1.....	\$21.00 to 21.50
Northern Foundry, No. 2.....	20.50 to 21.00
Northern Foundry, No. 3.....	20.00 to 20.50
Gray Forge.....	20.40

Coke.—There is a slightly increased inquiry for Foundry Coke for the first half of 1908 delivery, and some sales were made during the week. The demand for both grades on contracts continues strong and some producers are behind on deliveries. Prices are firm. We quote Furnace Coke at \$3 to \$3.15, at oven, and 72-hr. Foundry Coke for the balance of this year, and the first half of next year at \$3.25 to \$3.50, at oven.

Finished Iron and Steel.—New business in most lines of Finished Material is pretty light, although a few mills report some improvement, as compared with the few previous weeks. The general feeling regarding future activity, however, is better than it was, the change being partly due to the fact that collections show considerable improvement. Specifications are fairly good, no change being noted in this regard. While some consumers, particularly of Steel Bars, who are certain of their future requirements, are specifying three or four months ahead, the majority of consumers are specifying only for their early requirements. The most active demand at present is for Structural Material. Considerable new business is being placed in small lots.

Competition is brisk, and as prompt delivery is always wanted the mill that can make the promptest shipment usually gets the order. Deliveries on Structural are promised in from four weeks to three months. While there is a fair demand for Steel Bars on contracts, some consumers specifying to replenish stocks that have become depleted, new business is very light. The price remains firm. We quote Steel Bars at 1.70c., Cleveland, for car lots, with half extras. The Bar Iron market is very weak, and the demand light. The Empire Rolling Mills of this city shut down this week for lack of orders, but expect to start up again next week. Another local mill has a fair amount of orders on hand in new business placed by Bolt and Nut makers. The nominal quotation on Iron Bars is 1.65c., Cleveland, and 1.60c., Pittsburgh, but this price is being cut to get orders, and it is reported that contracts for a desirable tonnage of Western business have been closed on the basis of 1.55c., Pittsburgh. One sale of 500 tons of Standard Section Rails was made in the local market during the week, and another inquiry was received for 7500 tons for next year's delivery. There is not much demand for Plates, but prices remain firm. We quote Plates, 1/4 in. and heavier, carload lots, 1.80c., base, Cleveland. The demand for Sheets is light, and mills are making some price concessions. Hardware dealers have cut prices on Black and Galvanized Sheets, but jobbers are holding up stock prices. Forging Billets are in fair demand, and are quoted at \$33 to \$34, Cleveland, for early delivery. One Eastern mill reports sales at \$33 and higher, at mill. We quote Beams and Channels at 1.80c., base, Cleveland. While warehouse business shows some falling off, it is still fairly good. Prices are unchanged. We quote Steel Bars out of stock at 1.90c. to 1.95c., and Iron Bars at 1.95c. to 2c. Warehouse prices on Sheets are as follows: Blue Annealed, No. 10, 2.30c.; No. 28 One Pass Cold Rolled, 3.05c.; No. 28 Galvanized, 4.05c. Beams and Channels are 2.10c. to 2.15c., base, out of stock. Stock prices on Boiler Tubes, 2 3/4 to 5 in., are 64 per cent. discount, and on Black Merchant Iron Pipe, base sizes, 67 per cent. discount.

Old Material.—Prices have taken a further drop and dealers do not believe that the bottom has been reached yet, but expect still lower quotations. The decline the past week has been from 50c. to \$1 a ton on several grades of Scrap. The little demand for Scrap that has existed for the past few weeks has almost entirely disappeared. Local mills are doing no buying, and orders from outside mills for immediate needs are very scarce. Foundries are well supplied and there is as little demand for Cast Scrap as for mill material. Dealers' prices to the trade, per gross ton, f.o.b. Cleveland, are as follows:

Old Steel Rails.....	\$15.50 to \$16.00
Old Iron Rails.....	22.00 to 22.50
Steel Car Axles.....	21.50 to 22.00
Old Car Wheels.....	20.00 to 21.00
Relaying Rails, 50 lb. and over.....	27.50 to 28.00
Relaying Rails, under 50 lb.....	30.00 to 31.00
Heavy Melting Steel.....	15.50 to 16.00
Railroad Malleable.....	17.00 to 17.50
Agricultural Malleable.....	15.00
Light Bundled Sheet Scrap.....	12.00 to 12.50

The following quotations are per net ton, f.o.b. Cleveland:

Iron Car Axles.....	\$24.00 to \$25.00
Cast Borings.....	9.75 to 10.50
Iron and Steel Turnings and Drillings.....	10.50 to 11.00
Steel Axle Turnings.....	13.00 to 13.50
No. 1 Busheling.....	14.00 to 14.50
No. 1 Railroad Wrought.....	15.50 to 16.00
No. 1 Cast.....	17.00 to 17.50
Store Plate.....	14.00 to 14.50
Bundled Tin Scrap.....	10.00

English advices state that an experiment is under way, which, if successful, will mark a new step in marine propulsion and achieve results by which the *Lusitania's* speed record will be put in the shade. The keynote of the idea is the application of electricity to turbines. The steam turbine is most efficient when running at high speed, while a ship's propeller, on the other hand, will not work efficiently at the highest speed. It is impossible to gear down from a turbine to a propeller shaft, for the horsepower of marine turbines is too great for any practicable form of gearing. Consequently the turbine has to be run slowly, and an inevitable loss of efficiency in this direction is put up with. The plan upon which the firm of engineers is now preparing to make a practical test of is not that the turbine should be coupled directly to the propeller shaft, as is now done, but should drive high speed electrical generators and supply current to electrical motors for driving the propellers. It is believed that a speed of 30 knots per hour will then be practicable.

The British Consul in Bahia, Brazil, writes of a deposit of manganese ore in the Nazareth District, 30 miles south of the Bay of Bahia. Two mines are operated, owned by the Companhia de Manganese de Bahia. In 1906

the shipments were 4800 tons, all of which went to the United Kingdom. One of the mines is estimated to contain 100,000 tons of ore and the other about 250,000. Analysis shows a manganese content of 47 per cent.

Metal Market.

NEW YORK, October 23, 1907.

Pig Tin.—While Tin has fluctuated considerably, the low prices of the week are but slightly below those of a week ago. The amount of business transacted has been small, and a large part of the cargo of the Minneapolis will go into store. Price changes during the week have been as follows:

	Cents.
October 17.....	31.90 to 32.15
October 18.....	32.00 to 32.25
October 19.....	32.00 to 32.25
October 21.....	30.85 to 30.95
October 22.....	31.00
October 23.....	30.75

Consumers not only do not require as much metal as formerly, but are buying only in small quantities, and delaying their purchases as long as possible, which in a measure accounts for the price irregularity. The arrivals so far this month amount to 2590 tons, and there are afloat for American ports 825 tons. The London market is again closed lower, at £139 for spot and £138 for futures.

Copper.—Prices are again lower with little buying from domestic consumers, although the takings for foreign account are large. Spot Electrolytic can be had at 12.12 1/2c. for cash, and probably lower figures would be named if there was any prospect of securing business; Lake is nominally quoted at 12.50c. to 12.75c., and can be had for domestic use at the inside figure. Casting grades can be obtained at 11.75c. to 12c. While further declines may be made, it is conceded that they will be the result of strained financial conditions, as at present levels there is a loss to many producers. Sales in London during the last three days have been heavy, amounting to about 10,000 tons. The London market closes easy at £55 10 s. for spot, and £55 for futures. The export situation continues to be especially interesting from the fact that the total exports from North Atlantic ports for the first 22 days of October reached 20,541 tons, which is already larger than the total for any month this year, the aggregate for the nine months ending October 1 being 128,000 tons, which shows that the American producers are now able to finance their metal in Europe, it being realized that only a fraction of these exports goes into actual consumption. Owing to the selling arrangements of some of the companies, the exports of Electrolytic during the first nine months of the year were largely supplied by the smaller producers. The imports continue heavy, amounting to 5400 tons so far this month, exclusive of ore and matte. This is largely accounted for by the increased South American production which is refined on the Atlantic seaboard. The net exports, after deducting the imports for the first eight months of this year, amount to 22,000 tons as compared with 66,000 tons during the preceding year, and it is unlikely that the unfavorable balance will be wiped out during the remaining months. The piled up stocks in this country aggregate about 110,000 tons and little relief will be expected from the curtailment of production before the first of the year.

Lead.—The Lead market is very quiet, sales of spot having been made at 4.60c. and 4.65c., New York. The St. Louis market is unchanged, at 4.50c. In London prices have declined, and Soft Spanish Lead is held at £18 5s.

Spelter.—The price of Spelter is firm, and some large sales have been effected during the last fortnight. In New York spot is held at 5.50c. to 5.55c., and in St. Louis at 5.35c. to 5.40c.

Antimony.—The metal is weak, with few sales. The nominal price for Hallett's is 11c., and for Cookson's 12c.

Nickel.—The price is unchanged, at 45c., for ton lots, and 50c. to 60c., for smaller quantities.

Ferroalloys.—Sales of car lots at under \$54, Pittsburgh, are again reported. There is a fair inquiry for 50 per cent. Ferrosilicon, at \$103 for spot, and \$100 for futures.

Tin Plate.—While specifications on contracts continue in good volume, orders for future delivery are scarce. Prices are unchanged, at \$3.90, f.o.b. Pittsburgh, or \$4.09, f.o.b. New York.

Old Metals.—Prices are lower, and the following dealers' selling quotations are largely nominal:

	Cents.
Copper, Heavy and Crucible.....	11.25 to 11.75
Copper, Heavy and Wire.....	10.75 to 11.25
Copper, Light and Bottoms.....	10.50 to 10.75
Heavy Machine Composition.....	10.75 to 11.25
Brass, Heavy.....	8.75 to 9.00
Brass, Light.....	7.00 to 7.25
Clean Brass Turnings.....	7.25 to 7.50
Composition Turnings.....	9.00 to 10.00
Lead, Heavy.....	4.50
Lead, Tea.....	4.12 1/2
Zinc, Scrap.....	4.25

PERSONAL

Thornton N. Motley, president of Thornton N. Motley & Co., 12 John street, New York, has returned to business after several weeks absence in Europe. While away Mr. Motley recovered from the effects of a fall in which he injured his leg.

Bernard Schuchardt of the German machinery firm of Schuchardt & Schutte is spending several days in New York. Mr. Schuchardt is visiting the trade in this vicinity and is making his headquarters at the St. Regis.

Fred H. White, formerly correspondent for the Pope Mfg. Company, Hartford, Conn., has accepted a position with R. B. Jacobs, secretary of the Jacobs Mfg. Company, who is promoting the First Annual Hartford Industrial Show, to be held in Foot Guard Hall, Hartford, Conn., December 16 to 21, 1907. On that occasion the leading manufacturers of New England will have their goods on exhibition.

Dr. W. H. Tolman of the American Institute of Social Service has returned from Europe, where he spent several months in the interests of the Institute. He was a delegate at the International Congress for Hygiene and Demography at Berlin in September, which was attended by nearly 5000 persons.

Dr. A. Haarmann, general manager of the Georgs-Marien Works at Osnabrueck, Germany, has returned home. Dr. Haarmann has been more closely identified than any other person in Germany with the introduction and development of the steel tie, and has studied the situation on this side of the Atlantic. He is a thorough believer in fostering the consumption of steel in this direction, and holds that a large tonnage when developed in this country will be to the advantage of all iron producing countries.

George Grove Blackwell of George G. Blackwell Sons & Co., Ltd., Liverpool, England, has received authority from the King of England to accept and wear the insignia of Officer of the Royal Order of the Redeemer, conferred upon him by the King of Greece.

David Spence, formerly superintendent of the Greenlee Foundry Company, Chicago, has accepted the position of superintendent of Greenlee Bros. & Co.'s new foundry plant at Rockford, Ill., which is one of the best equipped foundries in the State.

Andrew Carnegie is aboard the Baltic, expected this week.

W. L. Ward, president of the Russell, Burdall & Ward Bolt & Nut Company, Port Chester, N. Y., has been elected a director of the Hamilton Bank of New York.

David B. Carse has resigned the chairmanship of the Advisory Committee of the United States Steel Corporation. Mr. Carse and his brother, John B. Carse, have composed this committee since its formation five years ago, the duties of the committee being to keep track of all expenditures of the corporation under the appropriations by the Finance Committee. John B. Carse still remains with the corporation and will take care of the future work of the committee. Previous to joining the staff of the Steel Corporation, David B. Carse was president of the firm of Carse Brothers Company of Chicago, and before that general manager of Greenlee Brothers & Co. He was also resident engineer in charge of the construction of the Hegewisch Works, now known as the Burnham Works of the Pressed Steel Car Company. In leaving the Steel Corporation, Mr. Carse does so with the idea of taking up again the business of Carse Brothers Company, which company deals largely in machinery and supplies for railroad work. The company has been reorganized, a department of electrical specialties has been added, and the headquarters removed from Chicago to New York, with offices at 12 Broadway.

The Carnegie Steel Company is now paying into the city treasury one-eleventh of the entire amount of taxes collected in Youngstown. When the new additions and improvements being made to its Ohio Works are com-

pleted the company will probably pay one-fifth of the entire taxes collected by the city. Last year the personal tax on the Ohio Works amounted to \$22,485.50. The personal tax on the Union Works was \$5458.12. The realty tax on the Ohio Works was \$34,933.26, while on the Union Works it was \$11,511.10.

OBITUARY.

THOMAS H. WILLIAMS, Jersey City, N. J., died October 19, aged 59 years. He was president of the A. A. Griffing Iron Company and E. A. Williams & Son, brass foundry, both of Jersey City. He was a member of the American Society of Mechanical Engineers, the Engineers' Club, the Lawyers' Club of New York, the American Geographical Society, Washington, D. C., and the Carieret Club, Jersey City.

DAVID A. SMYTH died at Pasadena, Cal., October 11, aged 74 years. He was born in Newton, near Belfast, Ireland, and first lived in this country at Haverford, Pa. A machinist by trade, he founded the Smyth Mfg. Company, bookbinding machinery, Hartford, Conn., and was also widely known as an inventor of sewing machine appurtenances and appliances.

NOA WOLFF of Gebrueder Wolff, Neheim, Westphalia, died at the age of 99 years on October 4. He and his brother, who died this spring at the age of 92, were the first to make wire nails in Germany, 70 years ago. The deceased, who was the uncle of R. H. Wolff of New York, well known in the American wire trade, was active in business until a few days before his death, there having been found in one of his books recent entries and additions. The latter, which covered five pages, were absolutely correct.

Westinghouse Companies in Receivers' Hands.

Owing to the tight condition of the money market and the fact that the companies have enormous sums of money outstanding, which they are unable to collect, it has been deemed best for the interests of all concerned to appoint receivers for the Westinghouse Electric & Mfg. Company, Westinghouse Machine Company and Nernst Lamp Company. This action does not in any way affect the Union Switch & Signal Company and the Westinghouse Air Brake Company. It is understood that the three concerns for which receivers have been or will be appointed are crowded with orders, but owing to the reasons stated above it has been found necessary to place their affairs, temporarily at least, in this shape. The Security Investment Company, a Westinghouse interest, is also involved.

Castings, a new monthly journal devoted to foundry practice, has made its appearance. It is published by the Gardner Printing Company, Cleveland, Ohio, and the editors are H. M. Lane and Robert I. Clegg. The size is 9 x 12 in., and the first issue contains 76 pages of reading and advertising. In the variety and practical value of its articles and in the excellence of its typography the first issue is highly creditable and carries the stamp of success.

The length of railroad lines in operation in British India at the close of 1906 was 29,097 miles, the additions in the preceding 10 years being 7980 miles. The native states have been encouraged to develop railroad communication and the aggregate length of native state lines increased from 2002 miles in 1897 to 3471 miles in 1906.

The Wisconsin Central Railway Company expects to have its own line to Duluth completed early next year, which will open up a new route for the shipment of iron ore from Duluth and neighboring points.

The Machinery Trade.

NEW YORK, October 23, 1907.

Conditions of trade are not as encouraging as they were a few months ago, and many of those who expected a good fall business have been much disappointed. Not only have orders failed to come in in the quantity promised by the projects under way, but the belief that business would only recede to a normal basis has been severely shaken by the number of cancellations of orders, the slowness of inquiries to develop into orders and the financial situation, which appears to have become more acute the past few days. With financial conditions in such bad shape it is hardly possible that the large interests will go ahead with extensive improvements. The smaller enterprises are not so directly affected by the money market, and it is from them that most of the present business is being received, though the larger companies are also in the market to a limited extent. Consequently almost all the orders received cover only a few tools. During the past week merchants had much cause to complain of the small demand for machine tools, the business transacted being probably a shade lower than that of the previous week. Because of the many cancellations of orders deliveries are now about normal, and manufacturers are making more persistent efforts to secure new business. Reports are current that prices have been cut on certain tools, though no official reduction in prices on machine tools has been announced. The demand for second-hand machinery has fallen off considerably.

Machine Tool Builders' Convention.

The annual convention of the National Machine Tool Builders' Association, which came to a close at the Hotel Imperial, New York, Wednesday, October 16, went far toward establishing closer relations between the manufacturers and dealers, as the committee of dealers which visited the members' association was not only cordially received, but given assurance that the manufacturers desire to maintain amicable relations with the dealers. An unusual number of dealers attended the convention, and they had an opportunity to talk over business with the men they represented. An optimistic feeling prevailed among the manufacturers during the meeting and the session was of particular benefit to the trade, inasmuch as some of the more dubious ones who came to the meeting taking a rather gloomy view of the future outlook went away considerably encouraged. All of the committees, which are composed of the various branches of the machine tool trade and which met in executive session to discuss their particular lines, brought back to the convention the announcement that they had decided to maintain prices. Most of the spokesmen for the committees gave as their reason the fact that labor and material are just as high as they ever were, and consequently it would be impracticable to make any reduction at this time. It was noticed that the attendance at the meeting was larger than any the association had ever had in any of its sessions in this city, and particular interest was attached to the discussions. The discussion relative to the matter of ascertaining costs in shops took up the larger part of the time the association had to give up to such talks, and it was thought that at the next meeting a uniform plan of determining costs will be presented to the organization.

Nearly all those who attended the convention remained in New York over Thursday and attended an excursion given to the trade by *Machinery*. Besides the members of the association a large number of others connected with the machinery trade, including many prominent dealers, attended to the number of 500. The company had chartered a steamer for the outing, and the start was made at the foot of West Twenty-second street at 12 o'clock. The boat proceeded along the Hudson River, through the upper bay to the lower bay, and a turn was made off Coney Island, the excursionists returning through the upper bay and along the East River to Fort Totten, on Long Island Sound, where a stop was made and the Government machine shops and the large guns at the fort were shown by the officers. The excursionists re-embarked at 4.30 and returned along the East River to East Twenty-fourth street. During the trip a most excellent luncheon was served, and Alex. Luchars, publisher of *Machinery*, and his staff did everything possible to make the guests comfortable.

The Board of Directors of the Machinery Club met on Monday in the offices of the Watson-Stillman Company and passed on applicants for membership in the organization numbering more than 100. Thornton M. Motley, who has just returned from a trip to Europe, made some recommendations regarding the placing of contracts for crockery and other club equipment, which were accepted by the body. It was decided to hold regular meetings of the board on the second Wednesday of each month, and in the future applica-

tions for membership are to be indorsed by members at large instead of passed upon by the Membership Committee. All of the reports of the various committees were highly satisfactory, and they indicated that the organization is meeting with favor in the trade and is growing rapidly. It is expected that at a future meeting the directors will arrange for a general meeting of the organization, at which the members at large will be informed by the heads of the various committees of just what has been done. The club hopes to get in its quarters in the Hudson Terminal Building by next May.

Erie Railroad to Issue Machine Tool List.

Several developments came to light the past week which show evidences of some important machinery purchases within a short time. The most important of these is the report that the Erie Railroad has prepared a fair sized list of machinery requirements, and it is said in the trade that this machine tool list will probably be issued the latter part of this week or some time next week. It is understood that the tools are required for several of the company's shops in Ohio and New Jersey. For a long time the company has had in contemplation extensive improvements to its facilities in Jersey City, but from what can be gathered in the trade it is not thought that the tools are required for that point.

Westinghouse, Church, Kerr & Co., 8 Bridge street, New York, has lately received bids for the equipment of a power plant for the Union Station of the St. Louis, Iron Mountain & Southern Railroad at Little Rock, Ark., and it is expected that the engineering firm will shortly place orders for the equipment, which will include two 240-hp. water tube boilers, two direct connected generators, one air compressor, &c.

Quite a large sum of money is to be spent by the Kansas City, Mexico & Orient Railroad in the construction of the new shops at Wichita, Kan., plans for which have not yet been completed. Westinghouse, Church, Kerr & Co., New York, are now at work on the plans for the new shops, but it is understood that the buildings will not be constructed until the spring.

Before long the trade will hear of a good sized list of requirements for a railroad enterprise, the construction and equipment of which is to be done by the Rossiter, MacGovern Company, 90 West street, New York. The company has been awarded a contract to construct the lines of the Suffolk Traction Company which is to connect Brookhaven with Babylon, L. I. The line will be 23 miles in length, and the work of preparing the road bed is already under way. When this is completed a line of about 17 miles in extent will be constructed from Patchogue, L. I., to Jefferson, and later on other branch roads will be built. The company's power house will be located at Patchogue, and two stations will be built at points not yet selected. The power house at first will be of from 1500 to 2000 kw. capacity, and plans include the building of large car barns and a machine shop sufficient to take care of the rolling stock. None of the machinery equipment has been purchased as yet, and the machine shop plans have been made only in a general way. It is understood that the first matter to be taken up is that of equipping the power house, as it is expected to get the line in operation as soon as possible. J. G. Breckinbridge, president of the Rossiter, MacGovern Company, is chief engineer for the road, and A. R. Applegarth of Patchogue is the company's resident engineer.

It is probable that the Metropolitan Street Railroad Company will have to purchase some machinery to replace that lost in the fire which recently destroyed the car barns at 146th street and Lenox avenue, where repair shops were located. The two receivers have obtained an order from the court permitting them to rebuild the barns and shops, as since the fire the system has been crippled in its operations because of lack of facilities to make repairs.

It is understood that the General Electric Company, Schenectady, N. Y., is going ahead with the erection of its new plant at Erie, Pa., where it purchased a large tract of land last spring, and reports are current in the trade that the company will shortly come into the market for some equipment. It is stated that the company is about completing a foundry on the site, and that it will gradually extend the plant, constructing one or two buildings at a time until it has its entire plant as outlined completed. As soon as the foundry is in operation it is said that a pattern shop will be erected, and later on a large machine shop.

Although considerable machinery has already been purchased, the Cement Engineering Construction Company, 225 Fifth avenue, New York, is now in the market for machine tools, steam shovels, tramway equipment, steel building, shafting, pulleys, &c., and a large amount of iron bin work for the new cement plant it is building for the Seaboard Portland Cement Company at Alsen, N. Y. The plant will have a capacity of 8000 bbl. a day, and the power equipment will consist of 6000 hp. of Corliss cross compound condensing engines, water tube boilers, mechanical stokers, &c. John T. Holmes is president.

The machinery equipment for its new plant is now being made up by the recently incorporated Virginia Blower & Mfg. Company, Richmond, Va., and the equipment it intends

to install will include one set of 6-in. power rolls, 10 ft. long; one 10-ft. power brake, one 5-ft. heavy iron brake, one 4-ft. slitting shear, machines for making V crimped roofing, machines for making gutters and spouts in 10-ft. lengths, one heavy power punch, one light hand shear for cutting iron from 10 gauge up, one heavy power shear, one electric riveter, one multiple power punch, rotary power shears, one angle iron forming machine for circular shapes and one angle iron forming machine for angles. While the company intends to install this machinery eventually, it does not intend to put all of it in at once. The plant, which is being erected for the manufacture of blower system of heating and ventilation, dust collectors, &c., will consist of a main building, 50 x 100 ft., of corrugated galvanized iron, and an office building 25 ft. square, both buildings to be lighted by electricity. The plant is located on the Southern Railroad, which affords excellent shipping facilities. The company desires to communicate with manufacturers of pressed steel specialties.

The Imperial Steel & Wire Company, Temple Building, Toronto, Ont., about which mention has been made in these columns before, is now taking up the matter of equipment for the new plant it is to build at Fort William, Ont. The company desires to communicate with manufacturers of gas producers, with a view to installation at its new plant.

The large tannery to be built on a 20-acre site on the Newark meadows is to be erected by the J. H. Ladew Company, 325 Academy street, Newark, N. J., and plans are being prepared for the buildings by Harvey Murdock, 116 Nassau street, New York, who, it is understood, will not only construct the buildings, but decide on the equipment to be installed. It will be some time before the plans are completed, and it is not likely that the matter of machinery purchases will be taken up before December.

E. N. Cunningham, 1633 Caliope street, New Orleans, La., who has been engaged as engineer to prepare plans for a new electric light and ice plant for the Citronelle Light & Power Company, Citronelle, Ala., will have plans completed in a few days for the electric light plant and will then take up plans for the ice plant. The company will require one 200-hp. water tube boiler, one 150-hp. automatic engine, one 100-kw. alternating current 2200-volt generator, switchboard and other appliances for the equipment of the plant.

As soon as the Elkins Power Company, Elkins, W. Va., receives the renewal of its contract and franchise from the city it intends to install considerable additional machinery, including two 200-hp. return tubular boilers, one 100-kw. and two 200-kw. three-phase generators, direct connected to engines, and other apparatus necessary to complete equipment of its plant.

Catalogues Wanted.—The Railway Equipment Company, Portland, Ore., will be pleased to receive catalogues from manufacturers of railroad shop tools which it requires for equipping its proposed new plant. The company has purchased 6 acres of ground along the Willamette River, about 3 miles from Portland, where it will build shops for the repairing of locomotives and cars, and in which machinery will also be installed for making frogs, switches and general track work. The new site has excellent shipping facilities by both water and rail, it being located on the river. W. T. O'Brien is manager.

W. M. Hoke, Atlanta, Ga., who has been connected with the Atlanta Steel Company for the past seven years as assistant secretary and purchasing agent, has opened an office and yard at Howell Mill road and the Southern Railroad for the sale of machinery, iron and steel, metals, new and relaying rails and supplies. Mr. Hoke desires to secure catalogues from manufacturers of machinery.

Chicago Machinery Market.

CHICAGO, ILL., October 22, 1907.

That business in practically all machinery lines is quiet cannot be denied, but that the market is suffering from the attendant ills which inactivity of trade sometimes begets, may be vigorously disputed. The recession in business that began in the late spring has been so gradual that the various interests have adjusted themselves to the changed conditions without jar or discord. Moreover, the ultimate results of an overreaching demand that, in machine tools especially, clogged factory producing capacities on every hand, were unmistakably foreseen. Not much prescience was needed to make it plain that in this particular line of the machinery industry, at least, there must of necessity come a let-up in demand sooner or later, independent of extraneous causes. To a greater or less extent the same conditions prevailed in other branches of the machinery trade. It is, therefore, realized that the present situation merely reflects the effects of forces operating to readjust the natural market balance in this and other respects. While not attempting to minimize the adverse influences that inspire hesitation and retard progress, there is

a strong feeling among dealers and manufacturers alike that the climax of the present crisis has been liberally discounted, and that a strong reaction may reasonably be expected in the near future. In the meantime there is a fair amount of pick-up orders dropping in from various sections of the country. The South and West, bulwarked by the strength of ample resources derived from remunerative crops, have so far been but slightly affected by the stringency of money and its collateral results, the restrictive effects of which have elsewhere been severely felt.

During the week at least two shipments of fair size, including tool equipments for factories on the Western coast, have been made from this market. One of these was for a new manufacturing plant to be established at Los Angeles, and the other went to a Northern coast point. The indications are that the expected list of the Frisco System, reference to which has heretofore been made, will not be much longer delayed. In fact, a preliminary inquiry for boiler shop tools from this source is already in the market, and it is understood that the final revision of the entire list is now being made. From inquiries received by dealers it is thought that the Vanderbilt Lines are contemplating some tool purchases in the near future, but no direct information as to the extent or character of equipment presumed to be wanted is available. The local demand for all kinds of machinery is principally confined to replacement orders to supply imperative needs. Naturally, these require prompt delivery from stock, which in the majority of cases can be furnished by either manufacturer or dealer. The latter especially expresses satisfaction at the return to normal conditions which makes such transactions possible. In advices received of new installations there is apparently more activity in electrical light and power plant construction than in other lines. Here, too, it is noticed that the majority of such improvements are of Western origin. Whether the receding price of copper is to any great extent responsible for this movement is not certain, but that it is not without effect can hardly be questioned.

As a manufacturing center, in which iron and steel and related industries predominate, Indiana Harbor, Ind., is steadily growing in prominence. The latest addition to its industries is that of the O. F. Jordan Company, which has begun the construction there of a plant for the manufacture of railroad labor saving devices. These include a pneumatic or steam power earth and ballast spreader and Warener's adjustable car unloader. The main building will be 75 x 150 ft., one story, and of brick construction. Motive power will be supplied by a gas engine and the machinery equipment will include punches, shears, riveters and other tools suitable for plate and light structural framing work, all of which are yet to be purchased. Present plans contemplate the erection of additional plant buildings and equipment in the spring for car repair work.

It is the intention of the Standard Milling Company, proprietor of the Bayou City Rice Mills, Houston, Texas, which was recently destroyed by fire, to rebuild the plant. A close investigation of modern mill construction and equipment will be made before proceeding with plans. What motive power machinery and other equipment will be required has, therefore, not yet been determined.

The Camp Mfg. Company, Metamora, Ill., having increased its capital stock to \$100,000, will devote a part of the funds to the improvement of machinery equipment. It is planned to install an electric generator of sufficient size to furnish lights, not only for the factory, but for the streets of the town. Future plans contemplate the addition of a foundry plant, but this work will probably not be undertaken during the present year.

The Joliet Machinery Company, Joliet, Ill., has increased its capital stock from \$10,000 to \$25,000. The added resources are to be applied to improvements in buildings and machinery equipment.

Having outgrown its old quarters, the R. Herschel Mfg. Company, Peoria, Ill., maker of mower knives and sections has let contracts for the erection of an extensive addition to its plant. The new building will be 50 x 180 ft., for the equipment of which additional machinery equipment will be required in the near future. The business of the company for its fiscal year ending August 31 was the largest in its history.

An extensive brewery is to be built at Lincoln, Neb., by the Lincoln Brewing & Ice Company, which was recently organized and incorporated with a capital stock of \$300,000. Of this sum \$200,000 will be expended in the erection and equipment of the plant, work upon which will be begun in the near future, as it is expected to have the brewery and ice plant in operation by spring. Two 150 h. p. boilers and a 50-ton ice plant are included in the machinery equipment to be purchased. The officers of the company are Julius Reusch, president, and E. R. Bathrick, secretary.

The Board of Public Works, Grand Rapids, Mich., has in contemplation the purchase of new power equipment for the municipal pumping station, plans for which are now being considered. The use of electrically driven centrifugal pumps, triple expansion steam pumping engines, and also

producer gas power will be considered, although definite decision has not yet been reached.

Bay City, Mich., has authorized the construction of a new generating station on the West Side, and plans have been prepared for this improvement. Specifications for the machinery equipment to supply this plant are now on file at the superintendent's office. Bids will be opened on October 30.

Plans for a high pressure salt water auxiliary fire system at Oakland, Cal., to cost in the neighborhood of \$130,000, have been adopted by the Board of Public Works of that city, and it is probable that work of constructing the system will be started soon. The estimated cost of the plant is \$72,000 for the system of piping, \$48,000 for the pumping machinery and \$10,000 for buildings.

Cleveland Machinery Market.

CLEVELAND, OHIO, October 22, 1907.

The local machine tool market shows some improvement, both in volume of sales and inquiries as compared with earlier in the month. The general feeling among manufacturers as to future business conditions seems to have improved somewhat, and machinery builders and dealers are more hopeful that the demand will be better during the remainder of the year than it has been during the past two months. An indication of better conditions is the report from many sources that collections, which have been slow for some time past, show considerable improvement.

No large orders were placed during the week, the sales being nearly all one or two, and in some cases as many as four tools, for plant extensions. Purchases are all being made for early delivery, there being no disposition among buyers to anticipate their wants by placing orders for extended future delivery. There are still some cancellations of orders placed during the rush a few months ago, but they are less numerous than they were. Local engineering concerns that design and erect plants of various kinds throughout the country report little new work of much importance in sight, and some work previously projected is being held up because of the stringency of the money market. A number of small plants, however, are being projected in this territory, and some of them have come in the market with inquiries for machine tools. One local company dealing in machine tools reports an increase in its sales and inquiries here, also at its branches in Cincinnati and Detroit. The hopeful feeling regarding future conditions is not universal, however, as shown by another local machine tool dealer who came home a few days ago with depressing reports after a trip through New England, during which he visited a number of tool builders.

There is at present a good supply of second-hand tools on the market, with very little demand for them.

Local manufacturing plants continue to run at their full capacity, and with the falling off in the demand many of them are gradually catching up on their orders. Builders report a very good demand for locomotive cranes. The demand for castings continues good, and the iron foundries seem to have about all they can do. There is a better feeling among automobile manufacturers regarding next year's outlook, and makers of automobile parts now have a fair amount of orders on hand for work that the automobile people have been rather slow in placing. Stove and range manufacturers report their business very satisfactory, and some of them have more orders on hand than they had at this time a year ago.

The Novelty Enameling Company, recently incorporated with a capital stock of \$25,000, has leased the building formerly occupied by the Truss & Cable Fence Company, at East 105th street and the Nickel Plate Railroad, and will remodel it into an up to date enameling plant. An addition will be built, in which will be installed three ovens. The company will manufacture a line of enameled specialties, but not cooking utensils. Lee M. Raney, who was formerly in the same business in Newcastle, Pa., is in charge of the plant as general manager.

The City Brass Foundry Company has commenced the erection of an addition to its plant at 5310 St. Clair avenue. The building will be 50 x 70 ft. and will be used to increase the company's capacity for the production of automobile parts.

The Parr Grinding Globe Valve Company, Cleveland, has been incorporated with a capitalization of \$10,000, by W. S. Parr, C. F. Hass, W. I. Broadman, Charles A. Mattoon and Charles L. Stocke. Officers have not yet been elected. The company expects to establish a plant soon.

The Brown Hoisting Machinery Company reports that while the demand for its heavy ore and coal handling machinery has fallen off somewhat, owing to the retrenchments by the railroads, the sales of its lighter machinery are keeping up in very good shape and its plant is still being run night and day. The company's sales of locomotive cranes during the past few weeks have been larger than at any previous time in its history.

The Standard Foundry & Mfg. Company has commenced the erection of an addition, 72 x 80 ft., to its plant at 2717

East Seventy-fifth street. The additional capacity will be used for increasing the output of the company's stove and register departments.

It is expected that the Chanute Cement & Clay Products Company, Chanute, Kan., will go ahead in a short time with the erection of its 3000-bbl. cement plant. The project has been held up for some time. The Osborn Engineering Company of this city prepared the plans and will place orders for the machinery and power equipment when the company is ready to go ahead.

The Strand Heater Company, that was recently formed with a capital stock of \$10,000, by Henry Strand and others, has started a plant at 1122 St. Clair avenue for the manufacture of natural gas heaters.

The Ney Mfg. Company, Canton, Ohio, has awarded the contract for the erection of a four-story brick addition to its plant, 80 x 200 ft.

The Cleveland Machine Knife Company, now located at 946 West avenue, has secured a new site, and expects to begin the erection of a new and larger plant about the first of the year.

The new plant of the Seneca Chain Company at Mansfield is now in operation, the first links having been made October 11. The plant will be in charge of N. L. McArthur, as superintendent, who held a similar position at the Zanesville plant. It is expected that the plant will soon furnish employment for 250 men.

The Buckeye Handle, Gear & Bending Company, Alliance, Ohio, has been incorporated with a capital stock of \$10,000 by S. A. Wells, Henry Eisenbraun, Walter H. Bidwell, J. S. Guthrie, and Robert I. Williams. The company has leased the Buckeye Spoke & Handle factory in Alliance, and will take possession November 1.

Philadelphia Machinery Market.

PHILADELPHIA, PA., October 22, 1907.

Developments in the local machinery market have been without special feature. The volume of new business coming out continues small, and there have been no inquiries or sales that would give any particular strength to the market. In some instances a more hopeful feeling prevails, but in others the outlook for the future is not considered bright. Orders recently have not been numerous, and are still confined to the smaller propositions covering a miscellaneous variety of tools, mostly for early delivery. Some cancellation of orders for machine tools came out last week, but local dealers and manufacturers were not largely affected. The market on the whole has been rather spotty, and while both dealers and manufacturers may have a good volume of inquiries or a fair number of sales during one portion of the week, the other portion is likely to show almost a complete cessation of business.

The financial situation is, undoubtedly, the principal drawback at the present time. Railroads, industrial plants and manufacturing concerns are more or less handicapped by an insufficiency of funds for improvement and extension, which would no doubt be undertaken under ordinary conditions, but with rates for money at a prohibitive figure there is little prospect of anything of that nature being undertaken until conditions are more favorable. Several of the railroads in this territory have announced policies of retrenchment for next year and state that their purchases of equipment will be limited, no extensions whatever being contemplated. Several of the larger industrial concerns have made statements of a like nature and in instances curtailment plans have already been put in operation.

While these statements have had a depressing effect on the trade in some cases, it is looked on in others as only postponing purchases for a time. Machinery and tools have been operated at such a high rate that their economy will soon be impaired, and as a matter of reducing cost alone there will, no doubt, be considerable buying for replacement. What the trade looks forward to in the near future is a more regular volume of business, made up of small sized orders, which will be sufficient to keep plants moderately well occupied without any of the rush feature, and if business develops on these lines the trade generally will be pretty well satisfied for a while at least.

Manufacturers as a rule keep pretty fully occupied. Plants are hardly as busy as they were a month ago, although there are exceptions to this, as some few manufacturers have had a good volume of business recently, little of which, however, has originated in this territory. One or two of the larger plants have reduced forces to some extent, while others contemplate the same action unless there is an early improvement. What causes tool builders particular concern at the time is the outlook for next year, as it is said that the volume of orders in hand for 1908 delivery is meager.

There has been no change in the foreign demand. Practically no new business has been taken in what are usually

termed the standard tool lines, although there has been some improvement in the demand for special tools and several good orders have been reported by builders of the latter lines.

Second-hand machinery merchants report a fair volume of business, largely of a day to day character. There is still a fair demand for some of the heavier tools, which, however, are hard to get. Medium and smaller sized tools make up the bulk of the sales and are practically all for immediate or very early delivery.

The demand for boilers and engines continues dull. While some business has been done, the aggregate is by no means large. There have been some sales of equipment of the smaller and medium sizes, and while some good sized propositions are under consideration, they have not as yet developed into actual orders.

Both iron and steel foundries are anxious for more business. In some cases foundries are busy at the time, but orders for the future are not as plentiful as the trade would like. But little business has come out so far for next year, even when concessions in prices are offered. Consumers are going along very conservatively, and orders for castings are being placed largely on a hand to mouth basis. Deliveries on all classes of work have improved materially, and under existing conditions it is difficult to say what will develop in the future.

M. A. Sherritt, who has been connected with the machine tool department of the Fairbanks Company for several years, resigned recently to accept the position of manager of the local branch house of Manning, Maxwell & Moore, to take charge November 1.

The Pennsylvania Iron Works, Eddystone, Pa., has had plans prepared and is taking estimates for the erection of a new testing shop, 24 x 126 ft.

Barwood & Snider, machinery merchants, in the Bourse Building, have been adjudged voluntary bankrupts. The amount involved is not large. This assignment, we are informed, will in no way affect the sale or delivery of the Pinkerton thread milling attachment, for which they were selling agents. That business will be transacted at the office of the Pinkerton Mfg. Company, 141 Oxford street, Philadelphia.

The Vandyke-Churchill Company, 91 Arch street, has recently been appointed exclusive selling agent for the Watson-Stillman Company, Aldene, N. J., in Philadelphia territory. The full line of the latter company will be handled, including punches, shears, railroad hydraulic tools, jacks, &c.

The Harlan & Hollingsworth Company, Wilmington, Del., reports that the car building department of its plant is fully supplied with orders, and the shipbuilding department has sufficient business in hand to keep it busy until the close of the year. New orders, however, are reported as not coming in rapidly.

The Ford & Kendig Company has purchased property at the corner of Twenty-fourth and Wood streets, measuring 129 x 266 ft., on which is to be erected a large manufacturing plant for its pipe and fittings business. Definite plans have not yet been made, and it is uncertain how soon the work of building the new plant will be started.

The Berger Brothers' Company, manufacturer of roofers' and sheet metal workers' supplies, has had plans prepared for the erection of a five-story factory and warehouse, 85 x 107 ft., at 106 to 114 Bread street. Owing to unexpired leases on the property, operations will not be begun until May 1, 1908.

The Conestoga Traction Company has purchased a site at Lancaster, Pa., on which it is proposed to erect a new car barn and power plant, on which it is expected that work will be started at an early date.

New England Machinery Market.

WORCESTER, MASS., October 22, 1907.

A slightly better tone prevails in the machinery trade, taking the situation as a whole. While business is not active, there are more inquiries than there were a fortnight ago, according to the reports of several of the dealers; not for large lots, but for a tool here and there, and occasionally for several tools. Little new shop construction is under way where provision has not already been made for the machinery and for power. The new inquiries and orders come from concerns that are balancing up their equipment or are making conservative increase in facilities for production, and occasionally a new industry is starting up, requiring a miscellaneous lot of tools. Cancellations are exceptions; in fact, the total of rescinded orders is by no means large, and it is believed that few more are to be expected.

Larger business has been deferred. Where bids have been invited during recent weeks they have been pigeon-holed with others of earlier date, pending developments in the situation. Of course there are exceptions to this rule, but they are not numerous. These prospective buyers, however, show no signs of a feeling that contemplated improvements should be dropped. They are holding off as a matter of pre-

caution rather than in a mood of discouragement. With the first signs of a change for the better some very nice business should be placed. Another factor in the situation is that buyers realize they need not place orders far ahead of the time when machines will be needed, because deliveries are becoming more prompt each week, though it should be added that certain classes of machinery are still scarce for immediate shipment.

The New York meeting of the National Machine Tool Builders' Association has produced a favorable effect on the market, and its influence will be greater as its results, direct and indirect, are felt, both in the trade and among the buyers. In the close contact of competitors in the various branches of the trade it was learned that no one has any inclination to lower prices. The logic of the argument advanced in the address of retiring President E. M. Woodward, that to reduce prices would in no way affect the aggregate number of tools sold; that every one in the trade would fare better if the manufacturers and dealers would maintain present lists, without having recourse to cutting their prices in order to win business, was agreed to by all in the informal discussions of the question outside of the meetings.

The machine tool builders who have new buildings under construction continue to push the work along that they may be in a position to manufacture for stock in large quantities if they succeed in passing immediate deliveries before the demand for machinery shall be renewed again. As has been stated in this column, the feeling is strong that it is one of the best kinds of good policy to prepare for the rising market when business is down, and every one in the trade expects a better demand in the near future. It is looked for to come as soon as the money market has grown easier, a condition which, it is argued, should arrive as soon as the great and profitable Western crops are moved, and the liquidation of stocks shall have reached its limit. Late in November is a common time to set for the change in the situation.

A rumor is afloat in the trade that a new company will be organized in the near future to manufacture a vertical spindle milling machine. It is generally connected with the various changes that have been made in the personnel of the Becker-Brainard Milling Machine Company, but there is nothing tangible upon which to base the association.

The E. J. Manville Machine Company, Waterbury, Conn., has given to the E. A. Eddy Machinery Company, Providence, R. I., the exclusive agency for its line of presses, for the Massachusetts and Rhode Island territory.

The Bannatyne Watch Company, Waterbury, Conn., has filed a certificate of its action in increasing capital stock from \$45,000 to \$100,000. A dispatch from Waterbury states that the company has had plans drawn for a substantial enlargement of its plant, which is the purpose of the increased capital.

The Critchley Machine Screw Company, Worcester, Mass., has taken a long lease of the shop at 100 Beacon street, occupied until recently by J. E. Snyder & Son, who have moved into their new shops. The business of the Critchley Company was recently established at 25 Union street, but almost immediately outgrew its quarters, necessitating a larger factory, and the Beacon street building offered the opportunity needed. The company now has 7500 sq. ft. of floor space, four times its original factory, and has added a number of new screw machines, most of them built by the Universal Machine Screw Company, Hartford, Conn. The business is rushing, and more machinery will be added in the immediate future, according to present plans. The product is all classes of high grade screw machine work. The company recently purchased a tract of land at South Worcester with the intention of building a factory of its own, but this plan is now deferred.

The Charles Parker Company, Meriden, Conn., manufacturer of vises, hardware, lamps, &c., has begun the erection of an addition to its foundry, which will be of brick, mill construction, 60 x 94 ft.

The Lawton Spinning Company, Woonsocket, R. I., has awarded the contract for a new thread mill that will cost \$450,000. Another large textile mill will be that of an enterprise headed by Abbot P. Smith, New Bedford, Mass., which plans to erect a spinning mill 130 x 480 ft., four stories, to be equipped with 70,000 spindles.

Austin & Crow, South Norwalk, Conn., manufacturers of toys, novelties, household specialties, &c., are to erect a new factory, 40 x 100 ft., and two stories, of frame construction, to replace the building destroyed by fire some months ago. Electric power will be bought, so that no power plant will be established, and the machinery is to be installed in mostly of special construction.

The American Can Company is to build a large can manufacturing plant at Eastport, Maine, replacing the works which were destroyed by fire several months ago.

The Holmes Motor Company, Groton, Conn., has increased its capital stock from \$30,000 to \$80,000. The company plans to increase its works at Groton, and to put in new machinery to take care of business already in hand for next season.

Cincinnati Machinery Market.

CINCINNATI, OHIO, October 22, 1907.

Although the expected fall improvement in market conditions has not as yet materialized to any great extent, and the stock dealers and the users of tools seem equally loath to announce themselves, the optimism of the local tool manufacturer is amply sustained by the condition of the order books, which calls for his best shop efforts for the remainder of 1907, and in many instances the first quarter of 1908. A large manufacturer in this field, in a chat on conditions, called attention to a policy inaugurated in its sales department several years ago. This company has a restricting clause which fixes the maximum number of machines of certain types and sizes that may be ordered in a given time for certain deliveries by its agents and representative dealers. In this way there is no chance for a dealer in a particularly prosperous time, and when he is enthused and excited over an inflated and unnatural demand, to load up his floor with stock which in a slump leaves him overstocked and works disadvantages at inventory periods. It is felt that the prosperous times of the early part of this and the preceding four or five months of 1906 induced a lot of this kind of buying, and therefore a little slump in demand at this time was inevitable.

Cincinnati tool men as a class fully appreciate their importance in the tool manufacturing industry of this country, and particularly since the meeting last week in New York, where they were so largely represented, and where so many Cincinnati and Western men were put on important committees. The committee appointed to frame a form of contract for selling machine tools, of which J. B. Doan of the American Tool Works Company is a member, is regarded as one of the most important. Another important item discussed at the meeting—viz., the devising of a plan to fix the responsibility for defective castings on foundrymen—will be threshed out here in meetings to be held prior to the new year. It is quite usual at this time of year for the tool men and foundrymen to arrange their contracts for the ensuing year, and several informal meetings of tool men have been held to talk the matter over, but no formal call for the trade has been issued as yet, and it was the desire of the manufacturers to avoid any agitation or publicity until preliminaries had been definitely fixed, and everything was in readiness to proceed on a thoroughly understandable basis. Three representatives of large local concerns have the matter in hand and as soon as the absent one—who is still in New York—returns the latter part of this week a call will be sent out for the first meeting.

The movement is variously regarded by the manufacturers. Some are perfectly satisfied with their existing contracts with foundrymen, others have some complaints to make; and in this class come the tool builders, whose castings are of the complicated kind and whose patterns require special treatment. Briefly, then, the points to be considered at the meetings to be held are: "Responsibility in the matter of defective castings," "gating of patterns," "upkeep of patterns," "shaving cores," and "credits on castings returned—a fair basis for settlement."

The custom of buying castings from the foundrymen on the basis of the pig iron market is very generally in vogue and seems to be perfectly satisfactory to the majority of both manufacturers and foundrymen. The last named class disclaims knowledge of any efforts to change existing conditions, and it is announced that nothing other than routine business will be discussed at the annual meeting of the local foundrymen's association, scheduled for November 7 at the Grand Hotel. It would seem that the appointing of this same date for the combined meeting of foundrymen from this city, Dayton, Hamilton, Springfield and Middletown, at Dayton, was ill advised. At this gathering a protest will be submitted against the increased rate on pig iron from the Birmingham District. The call issues from William Fetzer of the Fetzer Company, at Middletown, manufacturer of agricultural implements. E. E. Williamson, commissioner of the Cincinnati Receivers' and Shippers' Association, and Walter B. Moore, commissioner of the Dayton Association, will address the meeting and co-operate with the manufacturers. The meeting will be held at the Phillips House, in Dayton.

Returning to local conditions in the machine tool trade, little increase in inquiry is reported, but on the other hand very few cancellations are recorded. Practically nothing is heard from the dealers, who are seemingly waiting for something, not yet tangible. Such buying as there is comes direct; and this class of trade is very much appreciated just now; for it is practically cash, and helps out on collections which are not good. Order books are still well filled for future delivery, and very few of the local concerns will see clean sheets on the first of the year. There is no evidence of retrenchment seen, at least, on the part of the manufacturers, although it is expected a few men will be laid off about the

first of December. Quite a number of the large foundries are running half time or thereabouts, and have reduced the volume of melt that much or less, but this is accounted for by the fact that earlier in the year, and for some time, they were overtaxed, and driven to their highest limit to furnish castings when iron was lower. The natural result was an overstock of castings at the tool establishments, and a slump in operations at the foundry.

One of the newer local industries and which is enjoying a run of prosperity is the Standard Pulley Company, of Powers street, and Cincinnati, Hamilton & Dayton Railroad. The company has recently completed its new brick building, 50 x 237 ft., and installed the necessary machinery for turning out about four tons of pulleys per day. The organization of which the active head is J. F. Jewett, Jr., is a stock company, and owns and conducts its own foundry and machine shop. The company is just now working on a new product, the Baechle counter shaft clutch, and will be ready for formal announcements within a few weeks. The company also makes trolley splicers and friction clutches.

The Hercules Brass Foundry manufacturer of locomotive bells and brass castings has taken over the plant formerly occupied by the Hilbert Machine Tool Company, on Coleraine avenue.

The L. Schreiber Company, which has been gradually removing its plant to Norwood, has purchased an additional 100 x 150 ft., adjoining the new buildings, on Ivanhoe avenue, and will erect additional buildings.

The Lodge & Shipley Machine Tool Company has just secured its building permit for the new \$10,000 addition to be built on Spring Grove avenue, near Ethan. The addition has been needed for some time to facilitate the company's enlarged output. Mr. Shipley has just returned from the East; Mr. Lodge is expected the latter part of the week.

In the prosperous South Lima manufacturing field of Lima, Ohio, the latest innovation planned is the railroad to be called the Lima Southern Railway, and which has just been incorporated with a capital of \$20,000, with A. L. White as managing director. The line is to connect the two big establishments, the Lima Locomotive Company and the new Ohio Steel Foundry Company, which are about a mile apart on the Cincinnati, Hamilton & Dayton Railroad tracks. The new road will be used to run a dinkey morning and evening carrying the workmen, and for the transportation of steel castings from the foundry to the locomotive works, the latter turning over to the former all its business in this line, effecting a great saving to the locomotive works both in time and money.

Work is progressing on the repairs to be made on the plant of the Midland Steel Company at Muncie, Ind. A large engine in the south division of the plant will be thoroughly overhauled and improvements made in a number of the sheet mills located on this side. It is said that when repairs on this side have been completed the north side will be shut down and given similar treatment. Comment on the idle condition of the Muncie plant of the American Rolling Mill Corporation expresses doubts about the plant ever being able to resume operations. It is said that the plant may be dismantled, and other disposition made of the valuable parts.

Reports from Springfield indicate that the Springfield-Kelly Road Roller Company is enjoying an unprecedented run of prosperity; that the many big projects on in road building and improvements are stimulating orders for these machines to a remarkable point, and the company is pushed to its utmost capacity with orders.

A new foundry is to be built in Lexington, Ky. This is the Eagle Castings Company, capital stock \$75,000, and to be located on East Washington street, opposite the factory of the Hagen Gas Engine Company. The incorporators are: T. G. Cornell of Louisville, D. L. Pendleton, R. P. Taylor, Sam K. Hodgkin, J. A. Boone, J. H. Evans, T. E. Barnes, H. T. Davis, and J. Allen Griggs of Lexington.

The Majestic Furnace & Foundry Company is a new enterprise soon to be started in Huntington, Ind. J. M. Triggs of Morenci, Mich., is the promoter, and brings to his aid his brother, who is superintendent of an important department in the works of the Jones & Laughlin Steel Company at Pittsburgh. The city of Huntington contributed \$5000, and a number of substantial citizens have taken stock and will be interested in the directory, which is announced as follows: J. M. Triggs, C. A. Wilson and W. B. Rorick of Morenci, Mich., and J. F. Bippus, A. Reichenbach, E. E. Allen, Jacob Dick, J. P. Kenower and H. E. Rosenbrough of Huntington. The capital stock of the company at present is fixed at \$30,000. Construction has already commenced, and the new buildings, three in number, which will cost approximately \$10,000, will be located north of Market street and east of the Erie shops on the Erie tracks. Ten families of the present employees at Morenci, Mich., will locate in Huntington when the foundry is ready for work.

The C. & A. Potts Machine Company, Indianapolis, Ind., is a new enterprise. The capital is \$12,000, and the incorporators are Clayton Potts, Mary B. Potts and Henry Eitel.

Buckeye Lodge, No. 55, Machinists, of Columbus, Ohio, will establish a department for educational and social work.

Three rooms conveniently located at Broad and High streets are being comfortably fitted up for the use of the men.

Government Purchases.

WASHINGTON, D. C., October 22, 1907.

The Isthmian Canal Commission will receive bids until November 12, Circular No. 398, for motor and other supplies.

The Quartermaster, Key West Barracks, Fla., will receive bids until November 12 for 125-hp. boiler and accessories.

The following bids were opened October 14 for supplies for the Isthmian Canal Commission, Circular No. 392:

Bidder 1. American Hoist & Derrick Company, St. Paul, Minn.; 8, Bental & Margedant Company, Hamilton, Ohio; 26, Fairbanks Company, New York; 27, Frevert Machinery Company, New York; 29, Fox Bros. & Co., New York; 30, G. & W. Mfg. Company, New York; 49, Interstate Equipment & Engineering Company, Chicago, Ill.; 55, Lambert Hoisting Engine Company, Newark, N. J.; 58, Lenher Engineering Company, New York; 59, Lidgerwood Mfg. Company, New York; 62, Henry McCoy Company, New York; 63, Manning, Maxwell & Moore, New York; 68, Mead, Morrison Mfg. Company, Boston, Mass.; 70, Motley, Green & Co., New York; 72, National Iron Company, Duluth, Minn.; 81, Oliver Machinery Company, New York; 89, Pittsburg Industrial Iron Works, Pittsburgh, Pa.; 91, Pratt & Whitney Company, Hartford, Conn.; 92, Queen City Supply Company, Cincinnati, Ohio; 94, Reliance Machine & Tool Works, St. Louis, Mo.; 100, Chas. E. Robidoux, St. Louis, Mo.; 115, Vermilye & Power, New York; 124, Williamson Bros. Company, Philadelphia, Pa.; 128, Excelsior Equipment Company, Pittsburgh, Pa.

Class 17. Four hoisting engines—Bidder 1, \$17,064 and \$13,656, shipment 42 days; 30, item 40, \$3982, 90 days; 49, item 41, \$8985, 70 days; 55, \$14,733, shipment 21 days; \$13,875.40, shipment 28 days; \$14,304, shipment 16 days; 58, \$11,730, 70 days; 59, \$14,220 and \$12,360, 30 days; 62, \$13,776, 75 days; 68, \$12,400 and \$12,600, 63 days; 70, \$13,750, 70 days; 72, item 40, \$3800, commence 42 days; 89, \$13,660, 45 days, and \$13,000, 60 days; 92, \$11,460, shipment 60 days; 94, \$13,562, 150 days; 115, \$13,080, 70 days; 124, \$10,500, no time; 128, \$13,546, 90 days.

Class 18. One toolroom engine lathe—Bidder 63, \$833, \$783, shipment 120 days; 91, \$1405, 210 days.

Class 19. One hand planer and jointer—Bidder 8, \$275, 75 days; 26, \$200 and \$245, 40 days; 27, \$268, 30 days; 29, \$281, 35 days; 63, \$288, \$271.60 and \$390, 90 days; 81, \$288, 90 days; 100, \$387.50, 30 days.

Class 20. One swing cut-off saw—Bidder 8, \$205, 75 days; 27, \$224, 30 days; 29, \$119.79 and \$132, 40 days; 63, \$180, \$218 and \$197, 90 days; 81, \$180, 90 days; 100, \$210, 30 days; 128, \$221.25, 30 days.

The following bids were opened October 15 for machinery for the navy yards:

Bidder 4, Armstrong Bros. Tool Company, Chicago, Ill.; 6, American Woodworking Machinery Company, Rochester, N. Y.; 8, Atlantic Works, Philadelphia, Pa.; 9, Abb Machinery & Supply Company, New York; 13, American Ship Windlass Company, Providence, R. I.; 14, Ajax Mfg. Company, Cleveland, Ohio; 17, Brown & Sharpe Mfg. Company, Providence, R. I.; 24, Becker-Brainard Milling Machine Company, Hyde Park, Mass.; 26, Bullard Machine Tool Company, Bridgeport, Conn.; 29, Berlin Machine Works, Beloit, Wis.; 31, Cleveland Pneumatic Tool Company, Cleveland, Ohio; 32, Chicago Pneumatic Tool Company, New York; 34, Camden Iron Works, Camden, N. J.; 36, Chandler & Farquhar Company, Boston, Mass.; 42, Commercial Electric Supply Company, St. Louis, Mo.; 43, Thomas Crowther & Co., Boston, Mass.; 55, Erie Foundry Company, Erie, Pa.; 58, Fairbanks Company, New Orleans, La.; 65, Greenlee Bros. & Co., Chicago, Ill.; 66, General Electric Company, Schenectady, N. Y.; 70, Hilles & Jones Company, Wilmington, Del.; 71, Hendey Machine Company, Torrington, Conn.; 72, Handlan-Buck Mfg. Company, St. Louis, Mo.; 75, A. E. Hoermann, New York; 77, Hamilton Machine Tool Company, Hamilton, Ohio; 78, Hyde Windlass Company, Bath, Me.; 81, Independent Pneumatic Tool Company, Chicago, Ill.; 84, Jones & Lamson Machine Company, Springfield, Vt.; 88, I. H. Johnson, Jr., & Co., Philadelphia, Pa.; 124, Northern Electric Mfg. Company, Madison, Wis.; 126, National-Acme Mfg. Company, Cleveland, Ohio; 128, Newton Machine Tool Works, Philadelphia, Pa.; 135, Pratt & Whitney Company, Hartford, Conn.; 142, Quincy, Manchester, Sargent Company, New York; 152, Charles E. Robidoux, St. Louis, Mo.; 156, Sherman, Brown, Clements Company, New York; 171, Snow Mfg. Company, Binghamton, N. Y.; 181, Toledo Machine Tool Company, Toledo, Ohio; 187, Wagner Electric Mfg. Company, St. Louis, Mo.; 192, Williams, White & Co., Moline, Ill.; 196, Williamson Bros. Company, Philadelphia, Pa.; 198, Wilmarth & Mormon Company, Grand Rapids, Mich.; 201, E. W. Bliss Company, Brooklyn, N. Y.; 203, Bental & Margedant Company, Hamilton, Ohio; 210, Burke Electric Company, Erie, Pa.; 216, Central Metal & Supply Company, Baltimore, Md.; 222, Excelsior Equipment

Company, Pittsburgh, Pa.; 223, Fox Machine Company, Grand Rapids, Mich.; 224, Fairbanks Company, Philadelphia, Pa.; 225, Frevert Machinery Company, New York; 226, Fairbanks Company, Baltimore, Md.; 227, Fairbanks Company, New York; 230, Walter H. Foster Company, New York; 232, J. A. Fay & Egan Company, New York; 234, Fairbanks Company, Boston, Mass.; 237, Garvin Machine Company, New York; 240, Richard W. Geldart, New York; 249, Ingersoll-Rand Company, New York; 253, Knox & Bro., New York; 262, Manhattan Supply Company, New York; 263, Montgomery & Co., New York; 265, Motley, Green & Co., New York; 266, Manning, Maxwell & Moore, New York; 273, Niles-Bement-Pond Company, New York; 275, Oliver Machinery Company, New York; 279, S. M. Price Machinery Company, Norfolk, Va.; 287, Rockwell Engineering Company, New York; 288, John B. Roache, Brooklyn, N. Y.; 291, Smith-Courtney Company, Richmond, Va.; 294, William Sellers, Philadelphia, Pa.; 305, Vandyck-Churchill Company, New York; 306, Westinghouse Electric & Mfg. Company, Baltimore, Md.; 309, R. M. Wilkinson Company, Norfolk, Va.; 312, Western Electric Company, New York.

Class 31. One power press—Bidder 181, \$850; 201, \$768.

Class 81. One wood planing and sizing machine—Bidder 6, \$2734; 29, \$3356.50; 72, \$2782.50; 152, \$2725; 232, \$2675.

Class 82. One mortising machine—Bidder 275, \$599 and \$576.

Class 83. One wood turning lathe—Bidder 6, \$450; 72, \$430; 152, \$428.50; 223, \$261; 232, \$413; 275, \$329.

Class 84. One standard sash, door and blind relishing and mortising machine—Bidder 6, \$440; 65, \$381; 72, \$446; 152, \$440; 232, \$424; 265, \$387.50.

Class 91. One furnace for melting scrap—Bidder 287, \$1050; 309, \$1220.

Class 92. One planing mill—Bidder 273, \$17,475; 294, \$20,900.

Class 93. Two universal milling machines—Bidder 17, \$2589.20; 24, \$2638; 71, \$2476; 226, \$2700 and \$2780; 237, \$2930; 266, \$2476; 273, \$2820.

Class 94. One No. 3 universal milling machine—Bidder 17, \$1679; 24, \$1663; 71, \$1600; 234, \$1855; 266, \$1600.

Class 95. One universal duplex milling machine—Bidder 36, \$1162; 234, \$1145; 266, \$1190.

Class 96. One bolt threading and nut tapping machine—Bidder 230, \$668; 234, \$730; 266, \$684 and \$700.

Class 97. One flat turret lathe—Bidder 84, \$1800.

Class 98. One speed lathe—Bidder 36, \$222; 225, \$224; 234, \$214; 275, \$240.

Class 99. One 12 in. by 6 ft. engine lathe—Bidder 71, \$743; 234, \$764; 266, \$743 and \$625; 273, \$894.

Class 100. One 14 in. by 10 ft. engine lathe—Bidder 71, \$936; 234, \$917; 266, \$936; 273, \$1061.

Class 101. One 16 in. by 10 ft. engine lathe—Bidder 135, \$1760; 234, \$981.

Class 102. One 24-in. upright drill—Bidder 77, \$496; 234, \$382; 266, \$400 and \$440; 273, \$430.

Class 103. One 36-in. upright drill—Bidder 77, \$910; 234, \$677; 266, \$775 and \$815; 273, \$723.

Class 104. Two sensitive drills—Bidder 43, \$316; 273, \$250.

Class 105. One twist drill wet grinder—Bidder 198, \$225.80; 225, \$224 and \$188; 234, \$195.

Class 106. One drop apron tool grinder—Bidder 225, \$348 and \$314; 266, \$353; 273, \$265.

Class 107. One floor emery grinder—Bidder 124, \$357 and \$661; 225, \$352 and \$493; 266, \$355 and \$494; 273, \$372.

Class 108. One buffing and strapping machine—Bidder 225, \$320 and \$392; 266, \$325 and \$394.

Class 109. One hydrostatic press—Bidder 34, \$1285; 234, \$1045; 273, \$1470.

Class 110. One cold sawing machine—Bidder 128, \$1433; 142, \$1423.75, \$1513.75, \$1485.75, \$1460.75 and \$1443.30; 273, \$1449; 305, \$1614.

Class 111. One slotting machine—Bidder 128, \$2452; 266, \$2510 and \$2590; 273, \$2213; 294, \$2400.

Class 112. One open side metal planing machine—Bidder 266, \$3475.

Class 113. One boring and turning mill—Bidder 26, \$2919.25; 230, \$4009; 266, \$3750; 273, \$3740; 305, \$4037.

Class 114. One 1500-lb. single frame steam hammer—Bidder 9, \$1450; 55, \$1395; 226, \$1600; 265, \$1663.25; 266, \$1579; 273, \$1440; 294, \$1600 and \$1560.

Class 121. One Armstrong cutting-off and grinding machine—Bidder 4, \$159.75; 222, \$174.90; 225, \$171; 226, \$158.50; 263, \$174; 266, \$169; 279, \$160.

Class 122. One Acme automatic multiple spindle screw machine, No. 52, with attachments—Bidder 126, \$2818.

Class 123. One single punching and shearing machine—Bidder 70, \$4100 and \$4200; 181, \$2250; 192, \$4100 and \$4270; 227, \$4900; 273, \$4550 and \$5038; 305, \$3788.

Class 124. One steam windlass—Bidder 13, \$1190; 78, \$875.

Class 126. One steering engine delivered at Norfolk and

one steering engine delivered at Portsmouth—Bidder 78, \$1950; 196, \$2500, \$2050 and \$1700.

Class 131. One combined scroll and resaw—Bidder 6, \$1025; 8, \$1163; 72, \$1228.50; 152, \$1224; 224, \$1025; 232, \$1226.

Class 132. One scroll sawing machine—Bidder 6, \$420; 72, \$404.25; 152, \$399.75; 203, \$430 and \$536; 224, \$360; 232, \$413.

Class 133. One 30-in. hand planer and jointer—Bidder 72, \$735; 152, \$733.50; 223, \$520; 232, \$732; 275, \$795.

Class 135. One vertical drill press—Bidder 58, \$205; 225, \$194; 273, \$197.

Class 136. One screw cutting engine lathe, 24 in.—Bidder 58, \$830; 71, \$1328; 88, \$1241; 266, \$1328 and \$1265; 273, \$1232 and \$1420; 291, \$1328; 305, \$1272.

Class 137. One screw cutting engine lathe, 18 in.—Bidder 58, \$661; 71, \$833; 88, \$751; 266, \$833 and \$770; 273, \$744; 291, \$833; 305, \$763.

Class 138. One bolt heading, upsetting and forging machine—Bidder 14, \$2645; 58, \$2547; 225, 2298; 266, \$2675.

Class 151. One 16-in. swing screw cutting lathe with parts—Bidder 71, \$1170; 88, \$983.50; 226, \$978; 273, \$998.50.

Class 211. Nineteen induction motors—Bidder 42, \$2226; 66, \$2165.85; 187, \$2401.84; 210, \$2157.30; 306, \$2193.50; 312, \$2177.

Class 240. One pneumatic drill and one pneumatic hammer—Bidder 31, \$95; 32, \$120; 81, \$94; 249, \$96.

Class 241. One valve reseating machine—Bidder 156, \$325; 216, \$325; 222, \$300; 240, \$325; 253, \$325; 262, \$325; 263, \$325; 266, \$325; 279, \$325; 288, \$325.

Class 282. Six pneumatic drills—Bidder 31, \$360; 32, \$480; 81, \$357; 249, \$432 and \$480.

Class 283. Six pneumatic hammers—Bidder 31, \$192; 32, \$300; 75, \$264; 81, \$255; 249, \$180.

The following awards have been made for supplies for the navy yards, bids for which were opened September 3:

Kenworthy Engineering Company, Waterbury, Conn., class 1, one steel casting annealing furnace, \$2600.

Baker & Hamilton, San Francisco, Cal., class 47, one 20-hp. locomotive boiler, \$448.

Under bids opened October 4, circular No. 394A, for supplies for the Isthmian Canal Commission, class 1, two direct connected engines and dynamos and two switchboards has been awarded to the General Electric Company, Schenectady, N. Y., at \$1107.

Under opening of September 18, circular No. 387, for supplies for the Isthmian Canal Commission, Vermilye & Power, New York, have been awarded class 13, one vacuum pump, \$81.

Iron and Industrial Stocks.

NEW YORK, October 23, 1907.

The stock market was shaken up severely the past week by developments in connection with some of the minor copper producing interests which not only affected transactions in copper stocks, but also extended to banking interests closely identified with the management of the copper properties involved. It was necessary for the New York Clearing House to take measures to impart confidence. This immediately led to a recovery in prices which was quite marked on Monday, but on Tuesday further banking troubles developed, and a very large local trust company closed its doors, which brought about another pressure of panicky liquidation, and a recession to extremely low prices. The range of prices on active stocks covering the period running from Thursday of last week to Tuesday of the present week was as follows: United States Steel common 22 to 24%, preferred 81½ to 85%; Car & Foundry common 27 to 29½, preferred 82½ to 86½; Locomotive common 43 to 45%, preferred 88 to 96½; Steel Foundries common 5¼ to 5¾, preferred 26 to 28¾; Colorado Fuel 15 to 16½; Pressed Steel common 16½ to 20, preferred 68½ to 70; Railway Spring common 24 to 28%, preferred 75 to 76½; Republic common 14¼ to 17¾, preferred 59 to 65; Sloss-Sheffield 32¼ to 35; Cast Iron Pipe common 17½ to 21½, preferred 64½ to 66; Can preferred 40½ to 44. On Tuesday General Electric sold down to 105 and Westinghouse Electric down to 72, the latter making a sensational drop of 26 in less than an hour. To-day the cause of the heavy decline in Westinghouse stock was explained by the application for receivers for the Westinghouse Electric & Mfg. Company, Westinghouse Machine Company and Nernst Lamp Company. The Pittsburgh Stock Exchange closed and the demoralization on the New York Stock Exchange grew worse than on Tuesday, Westinghouse Electric selling down to 40. Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 22¼, preferred 82; Car & Foundry common 27¾, preferred 80¼; Locomotive common 42¼, preferred 88; Colorado Fuel 15; Pressed Steel common 16¾, preferred 68½; Railway Spring common 25; Republic common 12¾, preferred 53¾; Sloss-Sheffield common 33; Tennessee Coal 135; Cast Iron Pipe common 17; Can common 4, preferred 40.

The Washington Tin Plate Company, Washington, Pa.,

has filed notice of a bond issue of \$160,000, and an increase in the capital stock from the nominal sum of \$10,000 to \$300,000. This company was recently incorporated under the laws of Pennsylvania, and has purchased the tin plate plant at Washington, Pa., formerly operated by the McClure Company, of Pittsburgh, and is making some large additions to the plant.

Dividends.—The Pennsylvania Steel Company has declared a semi-annual dividend of 3½ per cent. on the preferred stock, payable November 1.

The Warwick Iron & Steel Company has declared a semi-annual dividend of 3 per cent., payable November 15.

The Trust Conference.

The trust conference of the National Civic Federation, to continue for four days, opened in Chicago October 22. About 400 delegates were present, representing 42 States and approximately 80 organizations of a mercantile, civic and municipal character. President Nicholas Murray Butler of Columbia University, New York, the president of the federation, called the convention to order and delivered an address, which was, in part, as follows:

"One of the most beneficent results of the development of the nineteenth century was the rapid growth of the corporation as an instrument for carrying on industry and commerce. Experience has shown us, however, that we have not been entirely successful as yet in adjusting our public administration and our legal theory to the situation which the multiplication and growth of corporations have brought about.

"My own opinion, which runs counter to that of many others to whom we are bound to listen with respect, is that nothing is necessarily to be feared from a corporation because of its size. The character of a corporation does not depend upon its size, but upon the principles and policies which actuate its management.

"Problems of grave importance, not only legal, but political in the highest sense, arise when we attempt to fix the ways and means by which the Government shall control and supervise public service corporations. Our constitutional limitations, our political traditions and past party differences, and the complex structure of our whole governmental system, with its State and national agencies, make the problem of governmental control of corporations an extremely difficult one.

"Above all else, unless we propose to wreck the whole economic basis on which our prosperity and our happiness rest, we must have a care that we so speak and so act as not to disturb that faith or confidence which civilized man has in his fellows, and upon which rests the whole enormous structure of our credit system. Destroy that and there will not be many public service or other corporations left to regulate for some time to come.

"We all know how much feeling, and what just feeling, has been aroused in the United States by corporate mismanagement. It is difficult to speak in language too strong of the usurpations of power and the larcenies of funds which have been committed by corporate officers. But let us not lose our heads. We are face to face with economic conditions that are new, and with economic abuses that, though manifold, have grown up slowly and in the dark. There is ample power in our institutions, in our constitution and our laws to check and to remedy them all.

"There is now reason to believe that the Sherman Anti-Trust law commits the nation to a policy which is too extreme, to a policy that, in putting an end to certain admitted evils, also puts an end to certain demonstrable benefits. Many of us believe that the act unduly exalts the principle of competition and fails to lay due emphasis upon the public benefits which may follow from properly regulated and supervised co-operation.

"It is a most important question, therefore, whether the time has not come when this act should be amended in order to relieve, not corporations, but the people, from limitations upon their business activity, which this act imposes, although in reality they are not necessary in the public interest. It is not combination itself, so much as it is unfair discrimination which should arouse our criticism and our opposition."

HARDWARE

THE litigation which is being carried on against the great corporations charged with violating the Sherman and other acts for the control and regulation of trade, besides involving great and complicated principles of law, which will probably furnish problems for the courts for some time to come, gives to the commercial classes in every line of business ground for serious consideration. As relating to important questions of public policy they are, of course, of interest to every thoughtful citizen, who recognizes that the wise settlement of these problems will have much to do with the continued welfare, not only of those directly interested in manufacture and commerce, but of the country at large. Most of the legal arguments relating to these high topics are technical and encumbered with what appears to the lay mind an unnecessary amount of circumlocution and legal verbiage, rendering the arguments forbidding to those who do not care to go profoundly into the subject. An exception to this is, however, found in the recent answer of the American Tobacco Company in the suit brought by the Government for its alleged violation of the Sherman act. The point is made that the success of the company has been achieved, not because of any illegal control of the market or by means of illegal methods in disposing of its products, but on account of good business management. In enforcing this point an admirable statement of the secret of success in the retail business is given, attention to which, rather than the establishment of a monopoly, is claimed to be the explanation of the company's successful career. However this may be, and leaving the legal questions to be determined by the courts, the conditions of success in retail merchandising as thus enumerated are certainly suggestive and deserve the best consideration of merchants of all classes. The things which are referred to as usually bringing success in a retail business are, in the words of the company's answer, as follows:

- An adequate working capital;*
- An efficient organization;*
- A knowledge of the business;*
- Good judgment as to the location of stands;*
- The maintenance of attractive stores, and the keeping of polite clerks;*
- The giving of good value to customers;*
- Trusting to volume of business rather than to excessive profits for income.*

Not many sentences are to be found even in association addresses ostensibly framed for the instruction of delegates, which are packed so full as is the above with practical wisdom, to which merchants large and small will do well to give careful thought.

Congress at its next session will be asked for legislation providing for the improvement of the consular service, which will include the creation of a new class of consular officer, to be known as commercial attaches. The plan is to attach such an office to each of the important embassies, and probably Secretary Root will ask Congress to provide for six of them, at salaries sufficient to insure first-rate men. Their duties would be to supplement the work of the regular consuls by traveling through foreign countries, gathering information concerning trade interests which would be of value to American manufac-

turers and exporters. They would have a roving commission, always seeking new fields of trade, studying the requirements of the people and their industries, and making comprehensive reports. It would be a class of original research that is not touched in any adequate way by many of the consuls in the reports.

The daily consular reports, as they are now published, are of little value to those for whom they are intended. The fault is partly with the consuls themselves, who do not have the right point of view in this department of their work, and partly with the too comprehensive editing of their reports as submitted to Washington. Manufacturers can use them to little advantage. It is doubtful if they have been of any material assistance in promoting our export trade with other countries. What is needed are full, intelligent reports from trained observers, men who have the basic knowledge of American industries and the general understanding and intelligence to grasp the salient points of foreign demands as they may be used to important purpose by those in this country whose business it is to provide for the wants of humankind.

The State Department realizes the weakness of the consular service in this work. A proof of this may be found in a recent instance, where a consul general who chanced to be in Washington was sent to a convention of Southern cotton manufacturers, that he might come in direct contact with the men who manufacture one of the great classes of goods for which he is trying to increase the market abroad. Hardware conventions would afford for consular officers a field of virile contact with manufacturers and their products. Other conventions of manufacturers of metal lines would be as prolific of inspiring ideas. This is the sort of training that would count, and it is presumed that the commercial attaches would be given ample opportunity to meet with the American manufacturers in their gatherings.

Condition of Trade.

While the slackening in the demand during the months of July and August was in most lines rather more marked than usual, it has been followed by more liberal buying, but generally in such quantities as are required to cover early needs. The number of orders received gives no ground for unfavorable comparison with other years, but in many cases these are for small lots and accompanied by a request for early shipment as urgently needed. This indicates that the stocks of the jobbers and larger retailers are becoming somewhat depleted and require reinforcement in spots. Goods which are to any considerable extent affected immediately by the decline in raw material, whether iron or copper, are in many cases showing either a softening in price or actual reductions. This refers especially to heavy goods in which the material is a principal element of cost. While the great mass of Hardware is but slightly affected by this decline in raw material, the reductions which have taken place have a tendency to make merchants more suspicious than they should be of the market as a whole. Many articles, indeed, did not keep pace during the year with the increased cost of making them, because of the higher prices for the raw material and the advances in wages, which have been frequent and in the aggregate impor-

tant. The great question apart from the financial one is in regard to the continuance of the great demand for iron and its products, which has made the last year or two so notable. It is not expected that prices will recede until there is a marked falling off in the demand. From the reports which are received from retail merchants throughout the country business generally is in large volume, with excellent prospects for the remainder of the year. How far the financial stringency is going to affect enterprise and lead to the postponement of improvements in railroads and other important projects remains to be seen. The curtailment of expenditure along these lines would obviously soon have a serious influence on the market at large, inasmuch as an important shrinkage in the volume of heavy business would lead to the development of lower prices and the discomfort and depressing influence of a falling market. It looks as if the merchants in all sections are to have a satisfactory fall business, with the prevalence of general prosperity in the agricultural sections, and with comparatively little diminution of activity in the manufacturing and industrial sections. There, however, is a good deal of complaint about collections, and the finances of the country, as well as those of individual enterprises, demand careful attention. Manufacturers and merchants, both wholesale and retail, will be aiding the general situation if they make efforts to be prompt in their remittances to cover goods purchased.

Chicago.

There seems to be a growing conviction among the Hardware merchants of the Middle West that there is nothing in the business outlook at the present time to warrant an attitude of ultra-conservatism respecting commitments on account of stock for the early months of the coming year. It is, of course, recognized that monetary conditions counsel prudence in extending obligations, but the fact remains that there will be a demand to meet in the coming season, and stocks will be required to supply it. Manufacturers' representatives returning from trips through the Mississippi and Missouri River Valleys and the Southwest are strongly optimistic in their views of the future. Generally speaking, merchants are placing smaller contracts for forward delivery, but it is believed these will be largely augmented between now and shipping dates. No doubt October business will show some shrinkage in volume over a year ago, but at that it will be of satisfactory proportions. In the large cities building shows decrease, yet it is noticed that many important building enterprises are pending and much prospective work is constantly developing, which is apparently halted only by the present scarcity and high price of money. No radical change in prices are reported, but the trend in many directions is toward lower levels. This is indicated rather by price shadings than actual revision of quotations. Trade in Corrugated Iron, both Painted and Corrugated, is strengthened by a good demand from Texas and the Southwest, and prices on stock orders are pretty firm at current quotations. Seasonable goods are moving in fairly good volume, and whatever may be said of the future no one has any serious complaint to make of present day business.

NOTES ON PRICES.

Wire Nails.—The market continues in an excellent condition, while new business and specifications on contract orders prevent manufacturers keeping up with deliveries with any degree of promptness. Farming communities are particularly large consumers, and apparently are not affected by the financial conditions prevailing at the money centers. There is a possibility of an advance in the price of Wire Nails, according to reports officially unconfirmed. Quotations on base sizes are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$2.05
Carload lots, to retail merchants.....	2.10

New York.—A fairly good business is enjoyed in the local market, but not as large as during previous months. Local jobbers and Nail houses are holding small lots at store at \$2.35 base, and in general this price is fairly well maintained.

Chicago.—There is no dissent from manufacturers' statements that the demand is wholly satisfactory and that, what with new business of fair volume and a heavy run of incoming specifications against contracts, the mills are crowded to their fullest capacity. This condition reflects in a marked degree the prosperous condition of the agricultural districts, where building improvements are seemingly exempt from the restraint imposed in other sections by money stringency. Quotations are as follows: \$2.23 in car lots to jobbers, and \$2.28 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—The one bright spot in the whole Steel trade is the Wire industry, which is exceedingly active in demand and on which prices are very firm. Makers of Wire Nails advise us that the demand shows no falling off, but on the contrary is steadily increasing and shipments are as heavy as at any time this year. It is estimated that another advance in prices is being contemplated by some of the leading interests. The market is very firm. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$2.05
Carload lots, to retail merchants.....	2.10

Cut Nails.—The market is not very active, as the demand is light, and confined to a large extent to orders for small lots, covering actual requirements. The market continues to be represented by the quotation for carloads of \$2.10, with freight added, from Pittsburgh, but this price is not in all cases strictly maintained, slight concessions being sometimes given on the base price or in the amount added to cover freight.

New York.—The demand is moderate and about in the usual proportion to that for Wire Nails at this season. Quotations for small lots at store range from \$2.30 to \$2.35 base, the former price being more or less general.

Chicago.—Though not exhibiting the strength and activity of Wire Nails, the market is not disturbed by any marked irregularity or weakness in prices. Locally the demand has been rather quiet for the past week. Two more mills, which have been inoperative for a couple of months, have notified customers of resumption. Quotations are as follows: Iron Cut Nails, carloads, to jobbers, \$2.38; to retailers, \$2.43; Steel, to jobbers, in carloads, \$2.28; to retailers, \$2.33.

Pittsburgh.—New demand for Cut Nails is light, buyers placing orders only for actual needs and for small lots. Prices are being shaded more or less, some of the mills actively seeking new business. We quote Steel Cut Nails at \$2.05 to \$2.10 in carloads, and \$2.15 to \$2.20 in less than carloads. The market is only fairly strong at these prices. Iron Cut Nails usually bring 10c. a keg advance over above prices.

Barb Wire.—The mills are largely employed in filling specifications on contract orders, which are being received in good volume by the mills. New business is not as active as it has been. The market is, however, firm, and quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.20	\$2.50
Retailers, carload lots.....	2.25	2.55
Retailers, less than carload lots.....	2.35	2.65

Chicago.—Though less active than other Wire products there is, besides new business now considerably diminished in volume, a plentiful supply of specifications against contracts coming forward. Prices are firmly maintained. We quote as follows: Jobbers, Chicago, car lots, Painted, \$2.38; Galvanized, \$2.68; to retailers, car lots, Painted, \$2.43; Galvanized, \$2.73; retailers, less than car lots, Painted, \$2.55; Galvanized, \$2.85; Staples, Bright, in car lots, \$2.35; Galvanized, \$2.65; car lots, to

retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—Only a small amount of new business is being placed, the mills running mostly on contracts against specifications which are still coming in at a satisfactory rate. It is evident that Smooth Fence Wire is rapidly displacing Barb Wire in nearly all sections of the country. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.20	\$2.50
Retailers, carload lots.....	2.25	2.55
Retailers, less than carload lots.....	2.35	2.65

Smooth Fence Wire.—The volume of orders exceeds that of last year for the same period and heavy shipments are being made by the mills. An impression prevails, to some extent, that an advance in price is possible in the near future. Prices are maintained. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. for cash in 10 days:

Jobbers, carloads.....	\$1.90
Retailers, carloads.....	1.95

Chicago.—Judging from the continued demand from manufacturers of Woven Wire Fence and other consuming interests for material, these industries are in a prosperous condition. Despite the heavy shipments going forward the requirements of the trade are not overreached. Quotations are as follows: In car lots, to jobbers, \$2.08, f.o.b. Chicago, and to retailers, \$2.15.

Pittsburgh.—The demand continues abnormally heavy, one leading interest reporting that its tonnage in Fence Wire booked so far this month is fully 75 per cent. larger than in the same period last year. Shipments by the mills are heavy and the market is very firm. In fact there are intimations that an advance in prices of Smooth Fence Wire at an early date is not unlikely and may come at any time. Quotations for base numbers 6 to 9 are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.90
Retailers, carloads.....	1.95

Jack and Safety Chain.—For some time business in Jack and Safety Chain has been in reduced volume. While there was no decided break in prices, it was apparent that the market was in a rather unsettled condition, especially as regards the Brass variety, which was influenced by the weak metal market. Leading manufacturers have now announced lower prices on Brass Chain, representing a decline of about 10 per cent.

Sash Cord.—The market for Sash Cord continues to show some irregularity, which has been more or less pronounced since the rupture of the understanding among most of the important manufacturers. Orders are being placed freely, from which it would appear that buyers regard prices as low. This view is also borne out by the report that some manufacturers have ceased offering Cord, declaring that they could not afford to sell it on the present market.

Spring Hinges.—Next season's business in Hold Back Spring Hinges will probably be governed by much the same conditions as prevailed last year. The market is an open one and quotations of different manufacturers cover a wide range, depending on the demand for their lines and the estimation in which they are held by the trade. Prices promise to hold on about the same level as last season.

Vitrified Sewer Pipe.—Eastern manufacturers of Vitrified Sewer Pipe and Fittings have had a prosperous season; in fact, their sales up to August 1 equaled their entire business of last year. The busy portion of the season with them is about closing and stocks are more or less broken in assortment. Prices are unchanged and probably will remain so, at least for the balance of the year. Quotations on carload lots, f.o.b. factory for Standard Pipe and Fittings, 3 to 24 in., are 82 per cent. discount on first-class goods and 85 per cent. discount on second-class.

Wire Screen Cloth.—It has been decided by agreement of most of the manufacturers of Painted Wire Screen Cloth to discontinue making the green variety, of-

fering instead the standard black. The change will be an economy for the manufacturers and will, it is believed, be entirely acceptable to the trade, reducing the amount of stock which they are obliged to carry. Some makers who have carried over varying quantities of green Cloth in the different sizes are sending schedules to their customers offering the stock subject to prior sale at moderate prices.

Conductor Pipe and Eaves Trough.—Under date of October 16, a new schedule of discounts recommended on Conductor Pipe, Eaves Trough, &c., was issued to the jobbing trade. These prices represent advances of 10 per cent. or thereabouts, on the majority of lines in all territories. A considerable decline will be noted in Copper Pipe and Trough. Viewed broadly the market cannot be reported as strong. Business is in small volume, sheets are easier and competition is active, one important manufacturer now occupying an independent position. Following is the new schedule.

	Eastern territory.	Central territory.	Southern territory.	Western territory.
Conductor Pipe:				
Galvanized Steel, standard sizes and gauges.....	70%	70-5%	65-10%	65%
Galvanized Steel, irregular sizes and gauges.....	70-10-5%	75%	70-10%	70%
Galvanized C. C. Iron, standard sizes and gauges.....	50-7½%	55%	50-2½%	45-5%
Galvanized C. C. Iron, irregular sizes and gauges.....	70-5%	70-5%	70%	65-10%
Copper, 14 to 20 oz.....	45%	45%	40-5%	40-2½%
Eaves Trough:				
Galvanized Steel, standard sizes and gauges.....	75-5%	75-10%	75%	70-10%
Galvanized Steel, irregular sizes and gauges.....	75%	75%	70-10%	70%
Galvanized C. C. Iron, standard sizes and gauges.....	60-10%	65%	60-5%	55-7½%
Galvanized C. C. Iron, irregular sizes and gauges.....	70-5%	70-5%	70%	65-10%
Copper, 14 to 20 oz.....	45%	45%	40-5%	40-2½%
Ogee Box and Roof Gutter:				
Galvanized Steel, standard sizes and gauges.....	75-5%	75-10%	75%	70-10%
Galvanized Steel, C. C. sizes and gauges.....	60-10%	65%	60-5%	55-7½%
Miters, End Pieces and Drops:				
Galvanized Steel.....	35%	35%	35%	35%
Galvanized Charcoal Iron, List net.	List net.	List net.	List net.	List net.

Brass Butts.—Business in Brass Butts is almost stagnant. A decline in prices is expected and buyers are holding off, while manufacturers, although admitting the necessity of a decline, are showing a disposition not to revise their quotations until there is some business in sight.

Copper Products.—No formal reductions in base prices on manufactured copper and brass materials have been made recently, although the impression prevails in the trade that with the advent of November there will be another general scaling of base prices in the various staples of this character. As during the past months, the market is listless and featureless, a waiting policy having become almost universal, with reductions in price for actual requirements regardless of formal base rates. Buyers are purchasing no material not actually needed, and, from the indications, will not do otherwise until they are convinced that bottom has been reached.

Rope.—Prices have not become stronger during the week, competition being active among manufacturers, and the price of Fiber continuing low, with few purchasers. Pure Sisal Rope is in limited demand, as mixed grades answer most purposes. Occasionally a merchant may have a trade on the best quality, or take pride in carrying a bright colored, good looking Rope. Some concessions in price may be made to induce the placing of large orders for future delivery. A manufacturer in the Central West quotes strictly pure Manila Rope on the basis of 11 cents per pound and strictly pure Sisal Rope at 8 cents per pound, f.o.b. factory. Base prices at New York are about as follows: Pure Manila, 11½ to 12 cents; B

quality grades down to 9 to 9½ cents; Pure Sisal, 9 cents; lower grades Sisal, 7¼ to 7½ cents; No. 1 Jute, ¼ in. and up, 8 to 8½ cents; No. 2 Jute, 7½ to 8 cents.

Window Glass.—According to reports, 20 hand operating factories, with a total capacity of about 600 pots are now in operation, and several other plants have fires in them, and perhaps will be put in operation before the end of the month. It is questioned by some whether the Amalgamated scale of wages is being paid, appearances favoring the idea that factories are working on private agreements regarding wages. Some manufacturers have made efforts to dispose of their stocks of Glass, and this has not had a sustaining effect upon the market. A general meeting of manufacturers is scheduled to be held to-day (Wednesday) at Columbus, Ohio. On Tuesday the manufacturers identified with the National Brokerage Company were expecting to meet at the same place. Unless something has been done at this meeting to insure continued concert of action of these manufacturers the dissolution of the company is looked for on November 1, as it is understood that the arrangement was entered into for one year, and that the time expires November 1. Manufacturers will then be entirely without an organization, and those who are carrying stocks of Glass will dispose of them as they think best. Under these conditions buyers restrict their orders, purchasing enough Glass to satisfy immediate requirements. The present outlook cannot be said to be encouraging for a firm market. Prices adopted by jobbers at this point are as follows: Single strength 90 and 10 per cent. discount, double strength 90 and 20 per cent. discount. These discounts apply to purchases up to 50 boxes. Over 50 boxes the prices are 5 per cent. better. The occasion for the advance in prices, it is explained, is that there is no immediate prospect of Glass factories getting to work, that stocks in manufacturers' hands are becoming depleted and some sizes scarce. It is understood that Chicago jobbers have adopted the following prices for Glass: Single strength 90 and 15 per cent. discount; double strength 90 and 20 per cent. discount.

Linseed Oil.—The Seed market has a declining tendency, but this has not affected the prices of Oil. There is a fair demand for small lots, but no placing of contract orders. Large buyers feel that it is better to wait until conditions are more settled, even if they then have to pay higher prices. New Seed has been slow and late getting to market, and it is doubtful whether the usual quantity will reach Eastern crushers before navigation closes. At this point Out of Town Raw, in five barrel lots, is quoted at 48 cents per gallon, and City Raw at 49 cents per gallon. Out of Town Raw, in carload lots, is quoted at 44 to 45 cents per gallon. Boiled Oil is 1 cent advance over Raw.

Spirits Turpentine.—Buying is comparatively light at this point, and the market is steady at last week's figures. Quotations are as follows, according to quantity: Oil Barrels, 55½ to 56 cents; Machine Made Barrels, 56 to 56½ cents.

THE GRAND CENTRAL PALACE AUTOMOBILE SHOW.

THE Eighth Annual Automobile Show, under the auspices of the American Motor Car Manufacturers' Association, which is associated with the Automobile Club of America, will be held in the Grand Central Palace, Lexington avenue and Forty-third street, New York, October 24 to 31, inclusive. The association, consisting of 51 manufacturers, had 26,000 sq. ft. of floor space for allotment at the Palace, with applications, it is said, for more than 30,000 sq. ft. Eight members of the association who, in the distribution by lot drew center spaces, are credited with marketing about 23,000 automobiles a year at present, the cars ranging in cost from \$400 to \$7000.

THE DRYER MFG. COMPANY, 204 East Twenty-sixth street, New York, manufacturer of the Chicago Clothes Dryers, has opened a branch office at 21 Concord square, Boston. J. B. Ricketts, treasurer of the company, will be in charge of this office.

The Atlantic City Conventions.

THE annual conventions of the American Hardware Manufacturers' Association and the National Hardware Association are now in progress at Atlantic City. The attendance is most representative of the trade in its manufacturing and jobbing branches, while the retail class is officially represented by the president and secretary of the National Retail Hardware Association. The Western delegation is very large, the Hardware special which left Chicago on Saturday bringing many. Other sections of the country are also adequately represented and the attendance as a whole equals, if it does not exceed, that of any former joint convention.

Many of the members of both associations were early on the ground, reaching Atlantic City on Tuesday, and some even on Monday. Among these were the officers, who were thus enabled to confer together and put the finishing touches on the programme. On Tuesday morning a meeting of the Executive Committee of the Manufacturers' Association was held. The formal opening of the National Hardware Association took place on Wednesday morning, the manufacturers and other visitors, including a large number of ladies, being present on invitation. W. S. Wright, president of the association, opened the convention in an appropriate address, after which the chorus of "God Bless Our Native Land" was sung by the gathering. Prayer was offered by Rev. John R. Davies, D.D., of Philadelphia. After the roll call Mr. Wright read his annual presidential address, this being followed by the secretary-treasurer's report, presented by T. James Fernley. Charles W. Asbury, president, and F. D. Mitchell, secretary-treasurer of the Manufacturers' Association, and S. R. Miles, president, and M. L. Corey, secretary-treasurer of the National Retail Hardware Association, were introduced to the assembly and made brief addresses. The business outlook was then taken up for general discussion and there was an interchange of opinions, mostly of a hopeful and encouraging character.

President Dexter and Secretary Hardy of the Canadian Wholesale Hardware Association were then introduced and made brief addresses.

The Chicago Hardware Special.

The Chicago special train secured for the accommodation of Hardwaremen *en route* to Atlantic City left that city Saturday at one o'clock, carrying a large and enthusiastic delegation. As usual arrangements for the trip were in the capable hands of W. H. Bennett, a fact which insured the comfort, convenience and good nature of all members of the party, as is known from the experience of former years. Provision was made by the manufacturers and their representatives to entertain the delegates and their guests with a complimentary dinner served at 5.30 p.m. in the special dining car attached to the train. During the interval between the arrival of the train in Washington, 11.15 a.m. and the departure for Norfolk by steamer, 5.30 p.m., special entertainment was provided, including luncheon at the New Willard Hotel and an automobile ride through the city.

As on former occasions the trip on the Hardware special is for the Western contingent a feature of interest second only to the convention itself. It has indeed assumed the importance of a fixed adjunct of the convention. The delegation from Chicago and its environs is augmented by those passing through Chicago from the West and Northwest, as well as by recruits collected at the various stopping places on the way East. Thus the long journey is made pleasant, and an exceptional opportunity is afforded for the cultivation of friendly, personal relations, which is recognized as one of the principal advantages of all trade gatherings. The party included the following:

A. A. Almsworth, Chicago.	E. E. Henkle, Lincoln, Neb.
Charles Stollberg, Toledo, Ohio.	E. S. Luetkemeyer, Cleveland.
Wm. T. Gormley, Chicago.	C. H. Carter, Omaha, Neb.
W. L. Sanford, Chicago.	H. J. Lee, Omaha, Neb.
John Donohue, Chicago.	S. R. Droscher, New York City.
Don McMillan, Chicago.	John Stollberg, Toledo, Ohio.
T. J. Usher, Chicago.	F. H. Mason, Sopkane, Wash.
W. H. Klauer, Dubuque, Iowa.	H. W. Caldwell, Cleveland.
D. B. Gann, Chicago.	

J. C. Kroner, La Crosse, Wis.
 F. S. Hires, Chicago.
 John H. Helmbuecher, St. Louis.
 Chas. Irlon, St. Louis.
 G. Wayland Smith, Oneida, N. Y.
 W. F. Earl, Oneida, N. Y.
 A. M. Kinsley, Oneida, N. Y.
 W. V. B. Topping, Ashland, Ohio.
 Frank M. Baldwin, Columbus, Ohio.
 Geo. T. Bailey, Pittsburgh.
 Jos. A. Fuller, New York City.
 E. A. Hoffman, Los Angeles, Cal.
 C. D. Clark, Peoria, Ill.
 Rudolph Tenk, Quincy, Ill.
 C. M. Hurst, Decatur, Ill.
 C. A. Knapp, Sioux City, Iowa.
 J. S. Hayes, Oskaloosa, Iowa.
 F. E. Cutler, Waterloo, Iowa.
 J. G. Bauer, Topeka, Kan.
 J. B. Silliman, Atchison, Kan.
 H. D. Lee, Salina, Kan.
 J. C. Fritchle, Salina, Kan.
 E. W. Morley, Saginaw, Mich.
 R. C. Morley, Saginaw, Mich.
 C. C. Philbrick, Grand Rapids, Mich.
 Major T. G. Walthers, St. Paul, Minn.
 George Garland, Kansas City, Mo.

R. B. Jones, Clyde, Ohio.
 F. D. Ford, Chicago.
 D. O. Macquarrie, Chicago.
 F. W. Fee, Chicago.
 R. T. Lund, Canal Dover, Ohio.
 H. A. Taylor, Chicago.
 D. A. Merriman, Chicago.
 Willard L. Harvey, Chicago.
 Palmer W. Holmes, Chicago.
 W. H. Bennett, Chicago.
 H. G. Reynolds, Dixon, Ill.
 A. E. Birge, St. Louis.
 E. N. Birge, St. Louis.
 E. M. Kemp, Chicago.
 J. K. Warren, Chicago.
 W. C. Dickey, Indiana Harbor, Ind.
 S. R. Miles, Mason City, Iowa.
 Daniel Stern, Chicago.
 J. R. Miller, Cleveland.
 Edward H. Lewis, Plymouth, Mich.
 J. F. Richards, Kansas City, Mo.
 Jno. A. Conover, Kansas City, Mo.
 E. C. Hough, Plymouth, Mich.
 Frank Gould, Chicago.
 Wm. Ross, Cleveland.
 C. E. Shields, Rock Island, Ill.
 F. B. Platt, St. Paul, Minn.

TRADE ITEMS

FREDERICK PETERS, Pickhuben 4, Hamburg, Germany, is now representing the Diamond Saw and Stamping Works, Buffalo, N. Y., on the continent of Europe. Mr. Peters carries a stock of Sterling Hack Saw Blades, from which samples can be furnished and small sorting orders delivered, stock orders being shipped from the Buffalo plant.

The second annual convention of the Wisconsin Retail Implement and Vehicle Dealers' Association will be held at Milwaukee, December 11-13. This association was formed in 1906 and is an outgrowth of the Wisconsin Retail Hardware Association. The sessions of the convention will be held at the Plankinton House.

CAVERHILL, LEARMONT & Co., Montreal, jobbers of Hardware and Metals, have recently been annoyed by two or three small fires which proved to be of incendiary origin. The perpetrator has been apprehended and is thought to be of unsound mind.

THE ROCKFORD WHOLESALE HARDWARE COMPANY, Rockford, Ill., jobber of Heavy Hardware, which was established a few months since, is now erecting additional buildings for the accommodation of its largely increased stock. This company has a capital of \$100,000 and the business is conducted by Hardwaremen of extended experience. The company's operations cover Illinois, Iowa and Wisconsin, this territory being canvassed by seven salesmen. The lines handled include Machinists' and Blacksmiths' Supplies, Wagon and Carriage Stock, Electrical Goods, Belting and Shafting, Paints, Oils, &c.

THE WASHINGTON HARDWARE AND IMPLEMENT DEALERS' MUTUAL FIRE INSURANCE ASSOCIATION, E. W. Evenson, secretary, Spokane, Wash., has issued a statement of its condition October 5, 1907. This association was organized by members of the Inland Empire Hardware and Implement Association, covering the States of Washington and Idaho. The statement shows that on January 1 of this year the insurance in force amounted to \$431,850, while on October 5 the amount had increased to \$649,750. The ratio of expense to premiums is 10.8 per cent., and the ratio of loss to premiums 15 per cent. The premium to be returned to policy holders during 1907 is 25 per cent.

W. T. AVERA has embarked in the manufacturers' agency business at Los Angeles and San Diego, Cal., with main office in the Hill block, San Diego, sales and storage accounts being solicited. Mr. Avera was formerly in business at Pocahtontas, Ark., under the style of the J. B. Avera Hardware Company, and sold out a short time since.

DUANE H. NASH, INC., Millington, N. J., has bought the plant and stock on hand of Nishwitz Mfg. Company,

maker of the Acme Pulverizing Harrow, Clod Crusher and Leveler, and will manufacture and sell this machine after November 1. The company reports that prospects for domestic trade are better than ever before, while recently established relations with houses in many foreign countries promise a large export business.

THE WIRE GOODS COMPANY'S NEW CATALOGUE.

THE WIRE GOODS COMPANY, Worcester, Mass., manufacturer of Wire Hardware, has issued a new catalogue, No. 6, which is notable for the great thoroughness in which it goes into a line of goods of very great diversity, both in the articles themselves and in their numerous sizes. The trade motto of the company is "Everything in Wire," and its Q Crown trademark is attached to over 4400 different articles, which are included in the catalogue. The catalogue is a large one, embracing 240 octavo pages. It is very copiously illustrated, most of the illustrations showing the goods full size. The company's intention in preparing the catalogue was to furnish the trade with a book of ready reference to cover every requirement in the purchase and sale of Wire Hardware, and the success of the effort is apparent. The subdivisions are Wire Hardware, consisting of the heavier lines, Kitchen Wire Hardware and Wire Specialties. Each has its section of the volume, and each in turn has its own series of subdivisions for quick reference, designated by page number.

Section 1 embraces 143 pages, its chief subdivisions being Bright Wire Goods, Mill Wire Goods, Brass Hooks, Chains, Wrought Goods, Drawer Pulls, Coat and Hat Hooks, Garment Hangers, Wood Screws, Wire Nails and Tacks and Staples. Much information concerning these complex lines is given, with the purpose of assisting the merchant in his buying for stock, his clerks in selling the goods and customers in their purchasing. For instance, a schedule of sizes is furnished for the Bright and Brass Wire Goods, in which Screw Eyes are given by their number, size of wire, length over all, length of stem and inside diameter of eye. Full particulars are furnished concerning such details as the number of goods packed in a box or to the pound. A new feature is a Jack Chain price-list, giving the number, diameter of wire and the list in the various materials and finishes. In Plumbers' Chains, where weight is an important consideration, the thickness of metal is carefully indicated. With the Wrought Eye or Swing Bolts diameter of wire, inside diameter of eye, length of thread and length over all are included in the price-list. Galvanized Rustproof Clothes Line Wire is listed with the number of the size, number of strands, size of wire, and the diameter of the coil. Coupled with the list is the average weight in pounds per dozen coils of different lengths. Eleven pages are given to Garment Hangers alone, with full details concerning each type. Complete price-lists of Standard Wire Nails are given. An interesting table is the approximate number of Wire Nails per pound, through all the various lengths and sizes. The lists of Double Pointed Tacks and Staples give the number packed in a paper, or to the pound; the size of wire, and the inside width and length in inches.

Section 2, with its 64 pages, is subdivided into Brollers, Pot Chains, Egg Beaters, Potato Mashers, Soap Brackets and Strainers, though other articles in considerable number are included, reference to them being found in the general index. Fullness of detail also characterizes this section. The Broller, for example, is described as to length and width in inches, the number of bars, including frame, the length of handles, space between bars and the size of wire of frame, bars and handles. Ten pages are devoted to the third section, that of Wire Specialties. Illustrations are given showing many kinds of special work, arranged systematically and each lettered so that it may be intelligently referred to, with information concerning finishes, gauges, threads, &c. Coupled with this department is a table giving the size, weight and length of Wire, Wire lists and a table giving the different standards for Wire, Drill and Screw Gauges in use in the United States. The catalogue is accompanied by a discount sheet, No. 27.

New Factory and Warehouse Center.

THERE are constant accessions to the group of manufacturers and merchants occupying space in the model factories and warehouses of the Bush Land Company, in the Borough of Brooklyn, New York City, to which reference has previously been made in these columns. Occupying building No. 1 are the National Cash Register Company, Dodge Mfg. Company, Pulleys; Metallic Decorating Company, decorated Metal Ware; M. T. Goldsmith, Silversmith; American Radiator Company, Sanitary Heater Company; John Johnson Company, factory filters; J. H. Rhodes & Co., grinders of pumice stone; C. Poyet, Inc., candy manufacturer, and William A. Higgins, handler of dried fruits. In building No. 2 are the Wheeling Corrugating Company, Dow Tire Company, Lefler, Thiele & Co., Enameled Ware; Republic Metalware Company, Fairbanks Company, and Roteng Engineering Company.

Republic Metalware Company and the Fairbanks Company:

Among the more recent tenants is the Republic Metalware Company, Buffalo, N. Y., whose new office, sample and sales rooms are located at 88 Warren street, Manhattan, New York City, in charge of W. J. O'Brien. This company is successor to Sidney Shepard & Co., the business of which was established in 1836 at Buffalo, N. Y., and manufactures an extensive line of Housefurnishing Goods, Cooking and Kitchen Utensils, &c. The company occupies the entire sixth floor of building No. 2, containing 45,000 sq. ft. of space. Here is carried a large stock of both manufactured goods and tinner's trimmings and raw materials, about 50 carloads having been received in the first two months of the company's tenancy. We are advised by the company that goods now average only about four days *en route* from Buffalo to the warehouse, where under former conditions, when the warehouse was in Cliff street, Manhattan, a day had often been spent at the terminals in Jersey City locating a car among hundreds on storage tracks, and the goods being handled several times before becoming available for delivery or reshipment in smaller quantities, with the accompanying liability of injury.

Another representative occupant, having 60,000 sq. ft. of floor space, is the Fairbanks Company, the Manhattan office of which is at Broome and Lafayette streets. This company, in addition to an immense Scale business, markets large and diversified lines of factory and mill supplies, having 10 branch houses, with accompanying warehouses in the most important cities of the United States and Canada, without mentioning those located abroad. In the Bush warehouse is gathered a comprehensive and well assorted stock, not only to supply the New York market, but in great measure many of the demands of the various branches. In a business of this magnitude there are necessarily many articles, both bulky and small, that are less active than others. Where formerly it was the practice to carry stocks of such goods at the various branch warehouses, the company is now, as far as possible, accumulating an adequate stock at Brooklyn, thereby getting the advantage of minimum carload rates, avoiding much unnecessary duplication and rendering better service to customers. In this particular business it is also frequently necessary to modify in some way such goods as Engines, Pumps, Mills, Scales, &c. These alterations or changes in Pulleys, Valves, Levers and other details to conform to specifications of buyers, not manufacturing, keep busy a force of 75 to 80 men. Likewise when receiving orders for bulky freight from branch houses, the addition of goods already ordered for that house or the inclusion of certain staples will often complete one or more full cars and so easily secure the lower freight rate. These are only a few of the advantages to which attention has been called.

South Brooklyn Development.

The development of this section of South Brooklyn concerns about 150 acres on the water front of New York Bay, both north and south of the Thirty-ninth street terminal of the ferry recently taken over by the municipality of New York. This ferry, like the other municipal ferry to Staten Island, has its Manhattan terminal adjoining the several other ferry slips at the Battery, on the extreme Southern end of Manhattan Island. For the Thirty-ninth street route, three large and powerful double deck boats, built especially for this service, are now in commission, which have reduced the former running time to 15 minutes between slips.

New Industrial Centers Demanded.

The constant advances in real estate values, correspondingly higher rents and the increasing congestion of business thoroughfares in the Borough of Manhattan, are among the causes that are continually forcing manufacturers and merchants into other localities, for the more economical production and warehousing of merchandise. This condition affects both the cost of production and time consumed in moving raw and finished materials. An adequate stock from which to quickly execute orders, whether for nearby trade, export business or miscellaneous shipment, is frequently more effective in increasing trade than concessions in price.

The Bush Companies.

A more intelligible understanding of this industrial enterprise will be afforded by a reference to the Bush companies, their mutually reciprocal relations and the presentation of some details not previously given. The Bush companies comprise the Bush Terminal Company, Bush Land Company and Bush Terminal Railroad Company. The property extends from Twenty-eighth street, along the water front of New York Bay, south to Sixty-third street and in large measure from the water front easterly to Third and Second avenues. The Bush Terminal Company is of long standing and occupies the larger part of the territory from the Thirty-ninth street ferry terminal to Fifty-first street, and back to Second avenue. There are six steamship piers, each 1450 ft. long and 124 warehouses, the buildings on the immediate waterfront being six stories high.

Ocean Steamship Docks.

There are 20 different ocean steamship lines using and sailing from Bush docks to various quarters of the world, among which are the lines of steamers represented by Funch, Edye & Co., Norton & Son and C. B. Richards; Prince Line, Associated Operating Company, Howard, Houlder, Rowatt & Co., Phelps Bros. & Co., John C. Seager Company, and American-Hawaiian Steamship Company.

Bush Model Factories.

The Bush Land Company, a later organization, has the property extending from Twenty-eighth street to Thirty-ninth street, and from Second avenue to Third avenue, one city square of which vacant property has been covered by the model factory buildings, Nos. 1 and 2, above referred to. These buildings are 600 x 75 ft., each six stories and basement, and three sides of each are reached directly from the street and avenues. Between the buildings are two spur tracks for loaded or empty cars. Building No. 3 is nearly ready, and No. 4 will be started soon, and in due course the rest of the vacant property will be covered with similar structures especially designed for manufacturing or warehousing purposes. The construction is of reinforced concrete, No. 1 being faced outside with light stone and red brick, No. 2 being entirely of concrete, as will be those which will follow.

Bush Terminal Railroad Company.

The Bush Terminal Railroad Company, by means of electric motors, shifts cars of solid or mixed freight from the waterfront, as received from any of the many rail-

road terminals, to any building for which freight, raw or finished, is intended.

Construction and Arrangement of Buildings

The method of construction is such as to lend itself readily for leasing in large or small areas, most of the present space having been taken on long leases. In the center of each floor is a room 75 x 300 ft., served by eight large power elevators, four at each end, capable of lifting 3 tons each, and fitted with automatic safety gates. The remaining portion of each floor is a space 75 x 150 ft. on each end and reached by the same elevator service. The construction is fireproof, the floors are abundantly lighted, naturally, by windows on four sides and 16 large skylights for each top floor, with electricity and gas for artificial lighting. The company also furnishes steam for heat and power, electricity for light and power, and water for any purpose. There are large auxiliary roof tanks, having an aggregate capacity of 150,000 gal., which likewise connect with an elaborate sprinkler system throughout all floors for "first aid" in any fire contingency. In an enterprise of such dimensions it is apparent that there is opportunity for growth and expansion in business located there and yet operated under similar conditions.

Transportation Accommodations.

A feature that will appeal to manufacturer and merchant is that of accessibility and transportation. It is unnecessary to dwell on the shipping and terminal facilities of the port of New York, unequalled in the Western Hemisphere, this location being in direct touch with every railroad and boat terminal in Manhattan, the Bronx, Long Island, Staten Island and New Jersey.

The Bush Terminal Company has a fleet of car floats, barges, lighters and tugs, necessitated by the large shipping interests it serves, handling both incoming and outgoing freight, domestic and foreign, and which is constantly picking up freight from full cars to miscellaneous shipments, as well as reshipping goods to all parts of the world.

Even full cars consigned to a company or individual are frequently lost, in busy times, for days, in a maze of storage tracks in large terminals, among hundreds or thousands of other cars, but with the certainty of constant daily removal and on a large volume of business, terminal officials serve their own convenience, naturally, by assembling all freight in any quantity in such way that it can be quickly removed when consigned to the Bush or any other large interest, thus avoiding vexatious delays.

Unloading and Loading at Factory Doors.

On the arrival of carloads or less than carloads at the Bush piers, the cars are shifted by the electric motors of the Bush Terminal Railroad Company to any particular building and unloaded on to covered platforms, and by means of the various elevators deposited quickly on any designated floor. Thus consignees have neither care nor responsibility for merchandise coming or going, beyond the elevator.

Outbound Shipments.

Outgoing merchandise in shipping order, with shipping receipt, is delivered to the company's agent, loaded into empty cars on the same spur tracks and floated to any railroad or boat terminal, without cost for cartage, in or out, and at the flat New York rate to every railroad terminal, save one, and at a charge of 5 cents per 100 lb. to boat terminals.

Bills of Lading Signed on the Premises.

The shipping receipt signed by the company's agent is exchanged for regular bill of lading to any point by an official in the building, who is the personal representative of the various lines.

Trucking Equipment.

For the accommodation of lessees who do not care to maintain a delivery service for local business the

company has a trucking force of 25 double teams, the business being accepted at an agreed charge. The transportation service not only handles the business of the various direct interests of the Bush companies, but that of a large local clientele occupying other property in this territory.

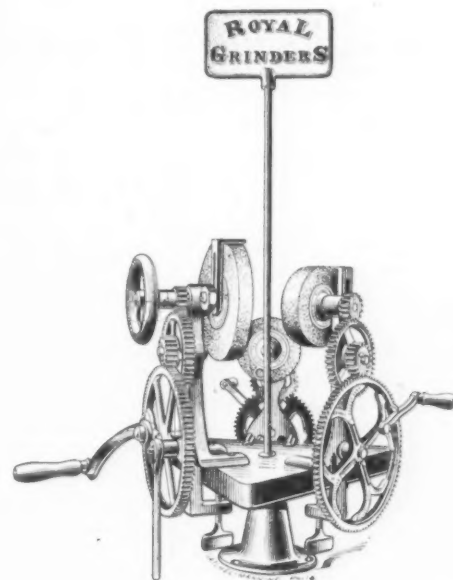
Tracks for 1200 Railroad Freight Cars.

On the Bush property there is track accommodation for 1200 railroad cars. In this connection it may be added that the municipality of New York has perfected plans for large piers on both sides of the Bush properties, from Twenty-eighth street to Sixty-fifth street, some of which are under way, and the land and water front from Bay to Second avenue, and Thirty-sixth to Thirty-eighth street, has been taken for the purposes of a public market. The municipal government is already committed to the expenditure of millions of dollars on these water front improvements, and some of them are planned and under way.

The bills for water, steam, gas or electricity are payable to one interest, instead of several, and there is the marked advantage of close proximity to a great labor market, with homes for laborers, clerks, managers, &c., nearby or conveniently reached, according to income and grade of living.

DISPLAY STAND FOR ROYAL GRINDERS.

THE ROYAL MFG. COMPANY, Lancaster, Pa., manufacturer of Hand and Foot Power Grinders, has got out the display stand here shown, which is furnished gratis to merchants. It is 26 in. high and 12 in. wide and



Display Stand Mounting Royal Grinders.

will show three of the company's machines, Nos. 01, 1A and 10, in actual position, thus aiding in demonstration and promoting sales. The stand is supported by a heavy base fastened to counter or show table by screws.

SUGGESTIONS WANTED FOR A JOBBING CATALOGUE.

THE EMMONS-HAWKINS HARDWARE COMPANY, a progressive house of Huntington, W. Va., advises us that it purposes issuing a catalogue suitable for its jobbing trade, and would appreciate any suggestions on the subject from merchants or from manufacturers of lines which it would be likely to handle. The company also states that it will be glad to receive proposals from individuals or catalogue publishers capable of getting out the work. The catalogue will contain perhaps 600 pages, size of page being 8 x 10 in.

REQUESTS FOR CATALOGUES, Etc.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, etc., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM GEO. W. CAREY, Beagle, Kan., who has succeeded the Barnett Hardware store, and will handle Hardware and General Merchandise.

FROM HOLLIDAY-LAIR HARDWARE COMPANY, which is arranging to go into the Hardware, Stove and Sporting Goods business at Sherman, Texas.

FROM MICHAEL DENIS, Little Falls, Minn., formerly of Denis & Jetka, who will in the future conduct a Hardware, Stove, Paint and Sporting Goods business under his own name.

FROM E. M. WALSH COMPANY, E. M. Walsh, proprietor, New Haven, Conn., which has bought the business of Geo. H. Baker Company, New Haven, and will in the future operate two stores.

FROM JOHN F. IRBY & Co., Ritzville, Wash., which has been incorporated with a capital of \$50,000, to conduct a Hardware, Stove, Implement, Paint, Sporting Goods and Saddlery business.

FROM HARRISON & GOULD, Milford, Conn., who have opened a new store, and will handle a general line of Builders' Hardware, Paints, Glass, Sporting Goods, &c.

FROM WILCOX HARDWARE COMPANY, Camden, Ala., recently incorporated with a capital stock of \$2500.

FROM STANNUS-KELLER HARDWARE COMPANY, successor to Hunt Hardware Company, Colville, Wash., which will combine the stock with that of Colville Hardware Company, recently purchased. The company will carry on a wholesale and retail business in Shelf and Heavy Hardware, Stoves, Tinware, Paints, Oils, Lumber, Lath and Shingles, Mining and Milling Machinery.

FROM CLEM HARDWARE COMPANY, successor to M. A. Clem & Bro., Monroeville, Ind., which has purchased the Hardware stock and fixtures of Shifferly Bros., transferring them to the new Clem Building on South Fifth street. The company will also continue its business in Dixon, Ohio.

FROM HARDY HARDWARE COMPANY, Portales, N. M., which has let the contract for the erection of a new building. The company handles Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Buggies, Wagons, Windmills and Piping.

J. R. WENDOVER, whose headquarters are at 39 West Twenty-first street, New York, has been recently appointed special agent for the sale of the Portable Vacuum Dust Extractors, put on the market by the Hygienic Cleaner Company. This device is a light movable machine 15 x 18 in. base and 36 in. high, weighing 78 lb., complete with electric motor attached. The power can be obtained by connection with electric light wiring in public building or private residence, requiring but 1-6 hp. to operate. Where electric power is not available it can be fitted for hand power, in which instance the cost is about 30 per cent. less, as no motor is necessary. In use no dust is raised, the strong suction causing the machine to collect dirt, moths, &c., from any surface, nook or corner reached and it can be readily moved about from floor to floor or room to room. This system, similar to the high power outfits, but adapted to every day requirements, is especially serviceable for home use, clubs, hotels, churches, offices, hospitals, steamships, manufacturers and others. At the above address demonstrations can be made at any time by arrangement with Mr. Wendover.

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Parcels Post Advocates Active and Aggressive.

FROM OUR SPECIAL CORRESPONDENT.

WASHINGTON, D. C., October 22, 1907.

IT is a conservative statement that the danger of the passage in the coming Congress of parcels post, post check currency and other legislation in the interest of the mail order houses is more serious than at any time since these projects were first brought forward. Never before have they been systematically urged upon the attention of the public by the Post Office Department, and even the advocacy of a domestic parcels post by Postmaster-General John Wanamaker, himself a large department store proprietor, was lukewarm compared with the crusade undertaken by General Meyer, who is losing no opportunity to push his propaganda in every possible direction. General Meyer has recently made five extended public addresses in which he has urged his elaborate programme of proposed changes in the postal system. A few days ago he addressed the convention of the Federation of Trade Press Associations in this city and immediately hurried to Boston, where he presented practically the same argument to the annual convention of postmasters.

Postmaster-General Meyer's Crusade.

In his Boston address General Meyer proposed as an "entering wedge" a reduction in the postage on merchandise from 16 to 12 cents per pound, and an increase in the weight limit from 4 to 11 pounds, with a wagon or automobile service for the free collection and delivery of parcels in all cities where the free delivery system prevails, and a special parcels post system "with an extremely low charge for service" to be established in connection with the rural free delivery. He further outlined the recommendations he proposes to make to Congress for the establishment of a postal savings bank system and post check currency and a system of stamp vending machines.

Revenue from Rural Free Delivery.

In discussing the rural free delivery in his Boston speech he stated that the postal deficit in 1896, when this service was established with an initial expenditure of \$15,000, amounted to \$11,500,000, while for the fiscal year 1907, when the expenditures for the rural delivery were \$27,000,000, the postal deficit showed a decrease of about \$4,500,000. "This is an undoubted evidence to my mind," said he, "that while the expense incurred in connection with the rural delivery is enormous, yet it has increased the receipts, and the benefits to our people cannot be measured in dollars and cents."

If General Meyer's calculations with respect to other features of this problem were no sounder than those here quoted, Congress would be apt to give them very little serious attention. The records of the Post Office Department show that at the present time the revenues of the rural routes average less than 25 per cent. of the total cost of the service, from which it is clearly apparent that on the basis of the expenditure of \$27,000,000 for rural free delivery last year the taxpayers at large were saddled with a burden of more than \$20,000,000 for the benefit of the 7,000,000 patrons of rural routes who received a service costing four times what they paid for it. In other words, but for rural free delivery the postal service during the past 10 years would have shown a comfortable surplus instead of a large deficit.

A Significant Newspaper Campaign.

But quite aside from the merits or demerits of the various features of General Meyer's programme the sinister methods now being utilized by its advocates to promote it constitute the gravest feature of the situation. Simultaneously with the delivery of General Meyer's addresses, there have recently appeared in a large number of daily newspapers commendatory editorials in a stereotyped style bearing evidence of a common origin and the earmarks of "paid matter." The most remarkable feature of this newspaper campaign is the fact that in many cases journals which for years have constantly opposed the parcels post upon broad grounds have been

induced to swing into line for General Meyer's programme without a word of explanation as to the cause of the sudden change of heart.

A Notable Change of Base.

As a case in point, the *Washington Post* on the 14th inst. under the caption, "Meyer Plans Good Work," published a leading editorial from which the following extract is taken:

It is with genuine gratification that we learn that the Postmaster-General has determined to make a vigorous campaign for the establishment of an adequate parcels post and a postal savings system. The extension of the rural free delivery has made the parcels post the next logical step, although appreciation of the opposition which these measures would encounter in Congress has hitherto prevented any of Mr. Meyer's predecessors from undertaking the fight.

Opposition to the parcels post will be the more determined, and the distinguished senior Senator from New York can be expected to rise in his seat and with all the force of his vigorous manhood protest against any interference with the monopoly of the express companies, while other equally patriotic statesmen, more or less beholden to the express and railroad companies, will work by various ways to defeat the efforts of the Postmaster-General. There is certain, too, to be more or less opposition from the small-town merchants, who will imagine they foresee their ruin in the increased facility with which their customers will deal with the mail order houses. Mr. Meyer, however, is convinced that in the end the advantage will be with the country merchants, because of the convenience they will enjoy in ordering from the jobbers small quantities of the supplies needed to replenish their broken stocks and special goods desired by their customers.

There is nothing remarkable about the above editorial considered by itself, but it is only a comparatively short time since *The Post*, under the caption, "Butting into Private Business," published an editorial denouncing the domestic parcels post as a long step toward socialism. Following is an extract from the editorial referred to:

It may be a matter of no consequence to members of the Postal Progress League, but to persons less directly interested than they are it is a fact of some moment that this scheme means a long step in a course whose terminal point is Socialism.

The masses of people have no special interest in or regard for the express companies or any other corporation, but all who are not socialists are opposed to governmental assumption of the work performed by corporations. They believe that it is the duty of the Government to regulate commerce between the States, not to become a gigantic common carrier of that commerce. They are so old-fashioned as to contend that it is the business of the Government to keep competition open by such regulation, not to kill competition by taking direct charge of private business. If express companies are to be crushed out by a competition against which private enterprise could not make headway, the logic which would sustain that stride in paternalism would call for Government ownership and control of railroads, telegraph lines, and lake, river and coasting vessels. The Postal Department, as well as the Agricultural Department, has already gone too far on paternal lines. The proposed parcels post would exterminate the country stores and ruin thousands of men who are filling useful positions, while it would not fill the places occupied by those stores. It is time for the Government to stop, not to extend, its butting into private business.

Another Comment.

In the editorial references in the daily press to General Meyer's plans, the "express companies and the country merchants" are invariably coupled in a contemptuous phrase. Another Washington newspaper in commenting upon a quotation from General Meyer's Boston address, in which he stated that a package could be sent from Boston to Europe by way of New York for less postage than if New York were the ultimate destination, has this to say:

This is a state of affairs that manifestly demands correction. The least Congress can do, as Mr. Meyer says, is to put our domestic service on equal terms with our foreign service. Only two elements are opposing this very desirable change—the express companies and the country retail merchants. Mr. Meyer has no patience with the former; and as for the latter, he would meet the objections by offering them the advantage of a parcels post on rural routes at special rates, 5 cents for the first pound, and 2 cents for each additional pound up to 11 lb., or 25 cents for a package weighing 11 lb.

The offset for the injury to be caused the retail merchant by a domestic parcels post as proposed by General Meyer will hardly strike the average business man with much force. The present regulations of the rural free delivery permit carriers to handle an 11-lb. parcel or any

parcel weighing more than 4 lb., and the fee usually paid by the patrons of the route for the service is 5 or 10 cents. Under the proposed system carriers would be debarred from handling packages weighing 11 lb. or less outside the mails, and the retail merchant would be obliged to pay 25 cents for this service, for which his customer now pays and at the modest rate of 5 or 10 cents. It will also strike the average retail merchant as a peculiar "advantage" that confers upon him the doubtful benefit of a cheap rural delivery after having turned his customers over to the mail order houses by the creation of a general parcels post.

A Broad View from Chicago.

It will be gratifying to Hardware retailers and to merchants in other lines to note that some of the leading newspapers of the country decline to applaud the new postal schemes, notwithstanding the fact that they are coupled with the assurance that it "will probably not be necessary to raise the publishers' rate on second class mail matter." The *Chicago Journal*, for example, although published in the hot bed of the catalogue houses, makes this significant comment:

When the proposal comes before Congress a cry of protest will arise from every small city, village and cross-roads in the country, and these merchants will undoubtedly have great influence with their representatives. It is not likely, therefore, that Congress will consent to Postmaster-General Meyer's plan.

A parcels post would be a great step toward concentrating all the mercantile business of the country in a few large cities. Nothing would be left for the man in the country to do but till the ground, and this would still further increase the rush to the cities, already too great for the national welfare; would still further depopulate the country. In a few years cities would contain the larger part of the population, and society would have to be reorganized, for it could not continue as it is under such conditions.

Congress should put its foot down and refuse to establish a parcels post, which would concentrate wealth still further, impoverish millions of people and be a serious injury to American civilization.

It remains to be seen whether Congress can be induced to take the broad view reflected in these comments, but it is believed that the leaders will not easily be convinced that the only opponents of a parcels post are the "express companies and the country retail merchants."

EIGHTH NATIONAL AUTOMOBILE SHOW.

THE Eighth National Automobile Show, under the auspices of the Association of Licensed Automobile Manufacturers, will be held in the Madison Square Garden, New York, November 2 to 9, inclusive. The available space will be used to the limit, including the basement, large room ordinarily occupied by the restaurant and the rooms above, and the exhibition promises to eclipse all the former shows given under the auspices of the association.

THE SCHOEDINGER-MARR COMPANY, Columbus, Ohio, has been incorporated, with a capital of \$75,000, to succeed the Schoedinger-Fearn Company, 106 North High street. The officers of the new company are F. O. Schoedinger, president; Fred H. Schoedinger, vice-president, and B. W. Marr, secretary and treasurer. Mr. Marr, the new member of the company, was formerly in the wholesale Hardware business in Memphis, Tenn. J. R. Dickson, who assisted in the organization of the old company 15 years ago, has disposed of his interests to the new company and taken a position with the sales department of the American Stove Company, Lorain, Ohio.

GEORGE H. SARGENT, whose recent election to the presidency of the house of Sargent & Co., New Haven and New York, was announced in our last issue, is the recipient of a new honor of an academic character. He has been elected president of the Board of Trustees of Leicester Academy, Leicester, Mass., at which institution he himself was prepared for college. Mr. Sargent feels much pride and pleasure at the honor thus accorded him.

HARRY CARVER has bought the Hardware business of Winn & Glougle, Fontanelle, Iowa.

PRICE-LISTS, CIRCULARS, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our Catalogue Department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

HOLLANDS MFG. COMPANY, Erie, Pa.: Illustrated catalogue B² for 1907-08, referring to Vises, Machinists' and Plumbers' Tools, Natural Gas Burners, &c.

THE DEMING COMPANY, Salem, Ohio.: Substantial illustrated catalogue No. 22, referring to Pumps and Hydraulic Machinery, including Well and Pump Fixtures and Supplies, Cistern, Well and Windmill Pumps, Iron and Brass Cylinders, Hydraulic Rams, Spray Pumps and Nozzles, Artesian Well Pumping Engines, &c. The catalogue also contains many tables and other valuable engineering information.

GEORGE M. CLARK & Co. Division, American Stove Company, Chicago: Catalogues No. 68 and 69, referring respectively to Jewel Gas Stoves and Jewel Gas Heaters and Radiators.

BRAUNSDORF-MUELLER COMPANY, Elizabeth, N. J.: Catalogue No. 1, referring to an extensive line of Mechanics' Tools, including Awls, Chisels, Drills, Gouges, Hammers, Punches, Sets, Vises, Wrenches, &c.

PITTSBURGH SHOVEL COMPANY, Pittsburgh, Pa.: Catalogue No. 4, illustrating and listing a complete line of Shovels and Spades, Coal and Grain Scoops, Post Ditching and Draining Tools, Telegraph Shovels and Spoons, Hickory Handles and Miners' Tools.

BUFFALO CO-OPERATIVE STOVE COMPANY, Buffalo, N. Y.: Illustrated catalogue and price-list for 1907-08, referring to Amherst Stoves and Ranges.

GRANITE STATE MOWING MACHINE COMPANY, Hinsdale, N. H.: Catalogue illustrated by full page plates, referring to various brands of Lawn Mowers and Capitol Lawn Trimmers and Edgers.

HAYDEN-CORBETT CHAIN COMPANY, Columbus, Ohio: Illustrated catalogue No. 2, referring to a complete line of Chains and Chain attachments, Sprocket Wheels, &c.

FRED. J. MEYERS MFG. COMPANY, Hamilton, Ohio: Illustrated price-list circular, referring to Fire Guards and Fenders.

MERIDEN BRITANNIA COMPANY, International Silver Company, successor, Meriden, Conn.: Elaborate catalogue No. 81 illustrated by effective full page half-tone plates, referring to 1847 Rogers Bros. Spoons, Forks, Knives, Box Sets, Chests, &c., together with convenient vest pocket price-list.

STANDARD STEEL TUBE COMPANY, Toledo, Ohio: Illustrated catalogue and price-list of Harris Steel Toys.

COLUMBIAN HARDWARE COMPANY, Cleveland, Ohio: Catalogue relating to Columbian original Trenton Vises and Anvils, including Solid Box Blacksmiths' and Horse-shoers' Vises, Parallel, Machinists', Coachmakers' and Farmers' Vises and Anvils.

MARSHALL-WELLS HARDWARE COMPANY, Duluth, Minn.: Special catalogue No. 78 of fall and winter Sporting Goods, referring especially to Firearms and Hunting Accessories, Gymnasium and Indoor Athletic Supplies, Skates and Sleds. The book is of particular value because of its full and accurate description of the goods catalogued.

MATCHLESS MFG. COMPANY, 35 Warren street, New York: Catalogue illustrating and describing Gas Lamps, Burners, By-Passes, Clusters, Gas Specialties and Fillings, Inverted Gas Lights, &c.

H. W. JOHNS-MANVILLE COMPANY, 100 William street, New York: Illustrated pamphlet relating to Acme Carpet Lining, consisting of thoroughly cleansed cattle hair, chemically treated, securely stitched between two sheets of heavy insulating paper.

The Sawyer Hardware Company has been incorporated at Sawyer, Wis., with a capital stock of \$15,000, by Victor Husting, Alfred Brembach and Arthur Maud.

System in the Store.*

Concluding Article.

Keeping Track of Business.

The sheets illustrated in Figs. 7 to 10 inclusive, are used to show how much business is being done, both cash and credit, month by month, how much has been paid for

pense. The sheets shown in Figs. 7 and 8 are bound opposite each other in the same binder for convenience.

Business Sheet.

The first item on the business sheet, Fig. 9, is Goods Purchased, and shows commodities bought for the shop and store, the bills for which are not yet due. The amounts are entered upon receipt of invoices. Under

[illegible]

Fig. 7.—Disbursement Sheet.

goods for the shop and store, whether disbursements in any department are excessive, &c. This information is put in condensed form in a monthly balance. It is not a trial balance in any sense of the word, but the system is used simply as a matter of satisfaction in keeping

Goods Sold the amount of cash sales is taken from the cash register in the store; the shop charges are taken from the shop day book or blotter, in which charges are made from the working slips, and the store charges are taken from the store day book or blotter. Under the

DAILY EXPENSE.									
	Car Fare	Freight	Shop	Store	Office	Stable	Sundries	Personal	
Jan. 2-07									
B. Barnett	2.0								
A. G. B. H. & L.		1.00							
R. & S. Lufz Co.				265 35					
Postage					10.00				
H. J. & C.			375 50						
Telephone							965		
Adams Ex.		50							
Boothman Hb.						16.00			
Cashier's								20.00	
Total	2.0	1.50	375 50	265 35	10.00	16.00	965	20.00	
Jan. 3-07									

Fig. 8.—Daily Expense Sheet.

track of the business. The sheets used are all the same size, 10 x 10 1/4 in. in size, and are kept in loose leaf binders.

Disbursements.

In Fig. 7 the disbursement sheet is shown, the items including those for car fare, freight, shop, store, office,

heading Credit Received is the amount shown by the credit book. This is a book kept on the office desk in which all money received on outstanding bills is entered, and at the end of the day the total amount is transferred to the cash book. Discounts and allowances are those deducted from invoices of goods purchased. Credit

[illegible]

Fig. 9.—Business Sheet.

sundries and personal. There are 31 lines to the sheet and the disbursements are footed up each day, and transferred to the

Daily Expense Sheet

shown in Fig. 8, this being a summary of the daily ex-

* This article, with the first installment, which appeared in *The Iron Age* October 10, describes the business system followed in the store of George Howard, Mount Vernon, N. Y.

charged to discounts and allowances is that given customers on goods sold. Profit and loss represents bad accounts. The entries are made on this sheet daily.

Monthly Balance.

Fig. 10 illustrates the form of monthly balance. For convenience this shows the transactions of January 2, but in practice the amounts would be the total of each item

for the month. The balance sheet is made up from the sheets shown in Figs. 8 and 9.

Inventory Stock Slip.

The stock slip shown in Fig. 11 is used in taking inventory, and gives the necessary information in condensed form. The slips are made of heavy manilla paper, 3½ x 13 in. in size, and after the goods are counted or weighed and the results entered on the slip it is kept

FULL BENEFIT FROM NEWSPAPER ADVERTISING.

BY O. B. JAMES.

A FEW years ago advertising was the art of keeping one's name before the public. To-day it is the science of selling goods through some form of publicity that will appeal to a man's reason. An advertisement

Jan - 2 - 1907									
10 Balance	9114 68			By Cash	20				
Base Sales	115 72			" Freight "	1 50				
" from Cash Book	376 32			" Sales "	375 50				
		9606 72		" Store "	265 35				
				" Office "	10 00				
				" Sales "	11 00				
				" Sundries "	9 65				
				" Personal "	20 00				
				" Bank Balance	7652 74				
				" Sales on Sale	435 63	8308 52			
				" Cash on Hand	240 15				
						9606 72			

Fig. 10.—Monthly Balance.

STOCK SLIP.	
No. 17	
Jan 15 - 1906	
2 - Guns 2 50	2 50
1 - " 3 " "	85
2 - " 4 " "	1 80
1 - " 6 " "	50
2 - " 7 " "	4 05
1 - " 8 " "	1 00
6 - " 9 " "	1 02
4 - " 10 " "	72
4 - " 11 " "	60
2 - " 12 " "	13 73
GOODS SOLD.	
3 - dy 2" Brass 4 00	60
1 - Gun 10 80	18
2 - " 8 " "	50
GOODS RECEIVED.	
3 - Guns 2 50	1 75
3 - " 3 " "	2 85
3 - " 6 " "	1 50
	5 80

Fig. 11.—Inventory Stock Slip.

with the goods to which it refers. As goods are sold, or new goods are put in stock during stock taking, they are noted under the respective headings. The slips are priced and extended before the entries are made in the permanent inventory book.

may be a "gold mine," it may simply "pay," or it may be a "money sink."

In order to realize the full benefit to be derived from newspaper space every word should be carefully considered and used in a way that will count. Even the name of the article advertised often goes a long way toward selling it.

As to Branding.

If you are selling Axes or some Tool under your own brand, as many dealers do, do not have them labeled "The Favorite," or "Wood Choppers' Choice," but give them a name that will suggest some inherent or exclusive quality, like "Diamond Steel," "Electric Tempered," or a name that will infer some special feature.

Patton's Sun Proof Paint is probably no more sun proof than many other Paints, but the name implies that it is, and its advertising value is wonderful. Asbestos Sad Irons contain perhaps an ounce of asbestos to 6 lb. of iron, yet the name asbestos suggests something different, something better. Do you believe that the Dover Company would have sold anywhere near as many Irons had they called them the Dover Sad Irons? Manufacturers and jobbers generally have grasped this idea and are winning out on it. The Simmons Hardware Company brands its Tools "Keen Kutter," the Norvell-Shapleigh Hardware Company calls its Tools the "Diamond Edge," E. C. Atkins & Co. brand their Saws "Silver Steel," while the Disstons are putting out a "Chrome Steel" Saw. When a suitable name is unavailable a short explanatory phrase attached to the name often helps.

Singular Pronoun Rather Than the Plural.

So much for a name, now for a suggestion as to the text.

I notice that many retail dealers doing business as an individual use the plural pronoun throughout their advertisements, like this: "Our stock is complete and we will try our best to please you.—JOHN JONES."

This is a great mistake. The modesty of such an advertisement is commendable, but its psychological effect is bad. We, our and us used in an advertisement signed by an individual implies that the business is being done by hirelings, and that no one in particular is responsible for anything. A prospective purchaser usually wants to know who is talking, and always prefers to do business

with the "boss." The idea that you personally look after the wants of your customers goes a long way toward selling the goods.

A NEW FACTOR IN THE SOAPSTONE MARKET.

STRONG interests, financially and commercially, have recently entered the market for manufactured Soapstone products in the constantly widening sphere for articles having Soapstone as a base, and in effective competition with the leading interest that has for many years practically dominated the trade in goods of this character. Soapstone has properties that especially qualify it for electrical, structural, laundry and plumbing purposes, it being particularly suitable for switchboards, lavatories, Tubs, Sinks, Shelving, Shower, Urinal and Stable Stalls, Tanks, Oil Vats, Flooring, Stair Treads, platforms and kindred uses, it being acid proof, fire resisting and of sanitary character.

The Phoenix Soapstone Company, the new organization, was incorporated early in 1904 with a capital of \$250,000, which is fully paid in, with as much reserve power financially as may be needed to fully maintain its position. For approximately three years the management has devoted its time and energies to developing the quarries at Crown Point, near Arrington, Nelson County, Va., where a modern manufacturing plant of adequate capacity has been erected, including homes for the operatives and their families.

The general offices are 7 and 9 Warren street, New York. The president, John C. Kelly, has for 30 years been president of the National Meter Company, a leading manufacturer of water meters and gas engines; Thomas E. Oliver, for 16 years head of Oliver Bros. Purchasing Company, New York, is vice-president; John G. Porter, Frank J. Oliver and Herbert B. Shoemaker complete the Board of Directors. John E. Eastmond is secretary and treasurer, and John G. Porter superintendent.

The company has several miles of Soapstone vein in the best territory in which the mineral is found in this country, upon which development work is constantly being carried on, the quality of which is considered exceptional, being, it is said, free from iron impurities, quartz formations and other objectionable admixtures which seriously detract from the value of the material. About half of the company's output at present is for electrical uses in the form of switchboards, barriers, &c., because of the high insulating properties possessed.

Quantities of the stone have already been furnished

Many architects and contractors, we are advised, have expressed their appreciation of the qualities of this Soapstone which is trademarked Crown.

MISCELLANEOUS NOTES.

Will's Junior and Cyclone Rickers.

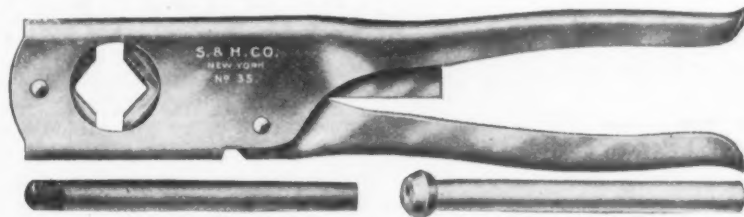
The Ideal Pump & Mfg. Company, Green City, Mo., is manufacturing wagon and ground rickers, both made of long leaf yellow pine. The junior is a wagon stacker and the Cyclone a ground stacker. In operation the head of the wagon ricker is lowered ready to receive the hay from the rake. The first elevation allows the load to be discharged 17½ ft. from the ground, and by extending the elevation the load may be discharged 22 ft. from the ground. The extension is accomplished by adjusting two upright standards, which are attached for that purpose. The ricker operates on any ordinary farm wagon, either high or low wheel. The horse works about 6 ft. from the stack, thus preventing the rope drawing the hay into the pulleys and clogging them.

Eclipse Machine Company.

The Eclipse Machine Company, Elmira, N. Y., maker of the well-known Morrow bicycle coaster brake, which has been on the market for so long a time, is now making coaster brakes in several different patterns for motor cycles. The company also offers a full line of bicycle hubs, both front and rear, and makes on contract ball cups, cones, head fittings, frame connections, &c. It is at present making parts for numerous automobile manufacturers, besides turning out fine and accurate machine screw parts for some large manufacturers in other lines. Enough of this class of work is kept constantly in hand to tax the capacity of the factory.

Adjustable Porcelain Tube and Carbon Cutter.

The Smith & Hemenway Company, 108-110 Duane street, New York, has just put on the market the adjustable porcelain tube and carbon cutter, No. 35, here illustrated. Its general dimensions are 1¼ x 9 in., and it has a practical cutting capacity of from ⅜ to ¾ in. diameter carbons or tubes, although the aperture is somewhat larger. It is made of sheet steel about 3-32 in. thick, and from its curved shape in body and handles is strong as



Adjustable Cutter for Porcelain Tubes and Carbon Rods.

well as comparatively light for carrying about. The tool is designed as an addition to the kit of electricians or others who need to cut rods and tubes of the character described in electric light and dynamo work. The jaws are both removable and renewable as well as adjustable, there being a total of seven adjustments, which can be instantly made by a slight manipulation of the handle and ratchet bar.

by this company for structural work, principally in New York, where it is used for platforms and stair treads in office buildings and structures, including the College of the City of New York, nearing completion, the Frammore Building, Brooklyn Rapid Transit Company properties and other important enterprises.

The first quarry opened up by the company, in a property covering 250 acres, has been stripped to a depth of about 60 ft. and 150 ft. long, from which with channeling machines the stone is taken out in blocks weighing 10 to 15 tons, being then cut into slabs with gang saws aggregating 30 to 40 blades each. Then the large unfinished slabs are taken into the general mill and by means of circular saws, planing, grooving and drilling machinery and rubbing beds, finished to shapes suitable for assembling into the many articles already referred to, much of which is according to specifications furnished.

A rumor has received some currency in the trade that Samuel Disston of Henry Disston & Sons, Philadelphia, was intending to take up the manufacture of Agricultural Tools on his own account. Mr. Disston emphatically denies that he has any such intention and states that he will in the future, as in the past, devote himself exclusively to the interests of the great corporation of which he is secretary and general manager.

Weissell Nut Lock.

Cheapness, simplicity of construction and application and durability and effectiveness in service are the features claimed by the Weissell Nut Lock Company, First National Bank Building, Chicago, for the device shown in the illustrations herewith. The locking feature consists of an open wire ring spiraled to fit the run of the thread. The first thread in the nut is cut away and

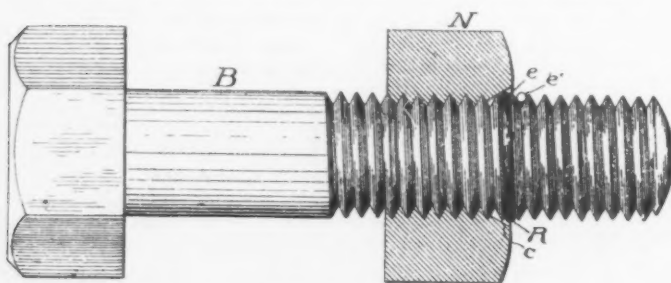


Fig. 1.—Weissell Nut Lock.

shouldered to form a seat for the inner end of the ring, as shown at *e*, in Fig. 1, where the points *e* and *e'* correspond to the open ends of the perpendicular ring, Fig. 2. After the bolt is tightened in place the wire ring is run up on the thread to the position indicated in Fig. 1 by a specially prepared driving nut. The material used in this ring is ordinary soft annealed wire, graduated in size according to the coarseness of the bolt thread, and does not depend for its holding power upon any spring qualities. The pressure exerted by unscrewing tends to expand the ring against the nut and tighten its hold. It is represented that the cutting away of the thread to provide a recess and seat for the locking ring can be performed at a single operation in the manufacture of the nut. While this device is designed especially for use on track bolts it is said to be equally effective on bolts of larger or smaller diameter used for other purposes. The results of tests made are claimed to have proved highly

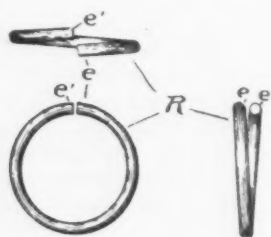


Fig. 2.—Weissell Nut Lock, Locking Device.

satisfactory. This nut lock is the invention of D. D. Weissell, Fort Wayne, Ind.

The New Stevens Telescope No. 462.

The accompanying illustration shows a new telescope offered by the J. Stevens Arms & Tool Company, Chicopee Falls, Mass., attached to its No. 80 repeating gallery rifle, for which it is specially designed. The telescope



The New Stevens Telescope No. 462.

has sufficient eye relief to admit of its being placed forward of the receiver and on the top of the rifle. The telescope has a power of $2\frac{3}{4}$ diameters; the field is as large as it is possible to make it. It is alluded to as remarkably bright and clear, so that at dusk or in dark woods, where the ordinary sight is useless, game is easily sighted with this glass. It is also recommended for target practice.

Standard Lamp Guard.

An incandescent lamp guard manufactured by Standard Wire Company, New Castle, Pa., is shown herewith. It is made of 15 gauge steel wire heavily tinned, bound by two sliding rings of the same material, making it strong enough, it is said, to withstand an even greater



Fig. 1.—Open.



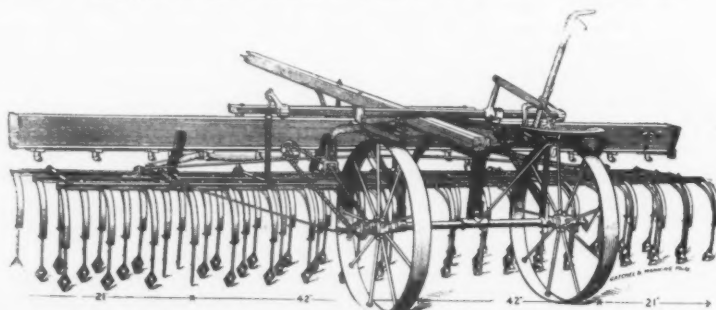
Fig. 2.—Closed Over Bulb.

Standard Lamp Guard.

shock than it is likely to receive. Being attached to the socket instead of the lamp, it throws no weight on the bulb, which might tend to pull it out of place and break the contact. By a simple operation the mere closing of the guard over the lamp fastens it automatically to the socket. By holding the half open guard well up on the socket the lamp can be screwed in place. Then the large ring should be slipped down as far as it will come, thus closing the guard and securing it to the socket at the same time. The device is offered for 16 or 32 candle-power lamps, with or without a safety cushion, which holds the lamp rigid and prevents it jarring loose. It is made to fit porcelain sockets without extra charge, and may also be had copper plated and burnished.

Improved Keystone Weeders.

The Keystone Farm Machine Company, York, Pa., has put on the market this fall Nos. 7 and 11 weeders, im-



Improved Keystone Weeder No. 11.

proved, fitted up with or without shovels. An illustration of the No. 11 machine is given herewith, with seeder points and seed box ready to sow grass, timothy, clover or alfalfa and cover at one operation, which is referred to as increasing and assuring a good catch. This machine is also made without seed box. The No. 7 weeder is a one-horse machine, fitted with seeder points, ready

to weed and cultivate between and over the rows. The points that go immediately over the rows are removed. The machines make a combined weeder and two to four row shallow cultivator, and can also be used as spike harrows. They are 12 ft. wide, so that from two to six complete rows can be cultivated at a round, which results in a saving of time.

Empire and Neptune Acetylene Lamps.

The R. E. Dietz Company, 60 Laight street, New York, and Syracuse, N. Y., will exhibit at the Madison Square Garden Automobile Show, November 2 to 9, a number of distinct novelties in automobile and motor boat lamps, two of which are here illustrated. The progress accomplished in the generation of acetylene gas has made it



Fig. 1.—Dietz Empire Acetylene Side Lamp for Automobiles.

practicable to place an "all acetylene" equipment on the modern car. The Dietz Company has produced in its Empire type of lamp, Fig. 1, a side lamp of large candle power from an acetylene gas tip, obtaining its supply of gas from the same generator as the headlights. The style of this lamp is reminiscent of the old French carriage lamps, the attractive appearance of which imparts a distinctively smart effect to the modern closed body high powered car. Fig. 2 illustrates the Neptune boat light, made by the same company, which consists of a powerful search light for use either at night or in mist or fog. It also has red and green semaphore signals on the sides.

The practical and serviceable feature of this article, in addition to its neat and pleasing appearance, is the fact that the acetylene flame is in correct focus, not only with the Bausch & Lomb searchlight lens, but with the two

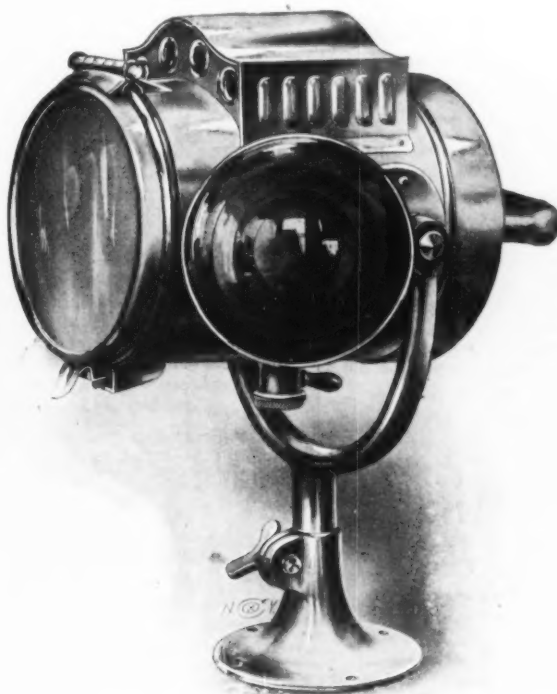


Fig. 2.—Dietz Neptune Motor Boat Acetylene Searchlight.

colored side lights, which latter may be seen from a long distance. The mechanical difficulties of so focusing the flame require skill and great care, but close attention is given to secure the best results.

G. A. KEMPEL & Co. and the Hardware & Supply Company, two of the oldest Hardware establishments in Akron, Ohio, will consolidate about January 1. R. M. Linney will retire from the former company. A large warehouse, 85 x 300 ft., is being erected for the use of the new company.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—	
	per gal.
Linseed, City, raw.....	48 @ 49
City, Boiled.....	49 @ 50
State and Western, raw.....	45 @ 46
Raw, Calcutta, in bbls.....	70 @
Lard, Extra Prime, Winter.....	74 @ 77
Extra No. 1.....	53 @ 56
No. 1.....	49 @ 52
Cotton-seed, Crude, f.o.b. mills.....	32 1/2 @ 33
Summer Yellow, Prime.....	51 1/2 @ 52
Summer White.....	53 @ 56
Yellow White.....	53 @ 56
Sperm, Crude.....	50 @ 50
Natural Winter.....	70 @ 72
Bleached Winter.....	74 @ 76
Bleached Winter, Extra.....	74 @
Tallow, Prime.....	62 @ 64
Whale, Crude.....	35 @ 36
Natural Winter.....	46 @ 48
Bleached Winter.....	49 @ 51
Extra Bleached Winter.....	51 @ 53
Menhaden, Brown, Strained.....	38 @
Light Strained.....	38 @
Northern.....	38 @
Southern.....	38 @
Cocanut, Ceylon.....	7 1/2 @ 8
Cochin.....	9 1/2 @ 9 3/4
Cod, Domestic, Prime.....	40 @ 42
Newfoundland.....	42 @ 44
Red, Elaine.....	46 @ 49
Saponified.....	6 1/2 @ 7
Olive, Italian, bbls., Yellow.....	75 @ 80
Neatsfoot, Prime.....	58 @ 60
Palm, Lagos.....	6 1/2 @ 7 1/4

Mineral Oils—	
	per gal.
Black, 29 gravity, 25@30 cold test.....	12 1/4 @ 13
29 gravity, 15 cold test.....	13 @ 13 1/4
Summer.....	12 @ 12 1/4
Cylinder, light filtered.....	19 @ 20
Dark, filtered.....	16 1/2 @ 17 1/4
Paraffine, 903-907 gravity.....	14 @ 14 1/4
903 gravity.....	13 @ 13 1/4
883 gravity.....	10 1/2 @ 11 1/4
Red.....	13 @ 14 1/4

Miscellaneous—	
Barryton.....	per ton
White, Foreign.....	\$18.50 @ 20.50
Amer. Roasted.....	19.00 @ 20.00
Off color.....	13.00 @ 16.50
Chalk, in bulk.....	3.00 @ 3.25
In bbls.....	100 lb. @ .35
China Clay, Imported.....	11.90 @ 17.50
Cobalt, Oxide.....	100 lb. 2.50 @ 2.60
Whiting, Commercial.....	100 lb. .43 @ .52
Gilders.....	100 lb. .55 @ .65
Ex. Gilders.....	100 lb. .60 @ .65
Putty, Commercial—	
In bladders.....	per 100 lb. \$1.70 @ 1.85
In bbls. or tubs.....	1.20 @ 1.45
In 1 lb. to 5 lb. cans.....	2.65 @ 2.95
In 12 1/2 to 50 lb. cans.....	1.50 @ 1.90
Spirits Turpentine—	
In Oil bbls.....	54 1/2 @ 55
In machine bbls.....	55 @ 55 1/2
Glue—	
Cabinet.....	per lb. 12 @ 15
Common Bone.....	7 1/2 @ 9
Extra White.....	15 @ 24
Foot Stock, White.....	12 @ 14
Foot Stock, Brown.....	9 @ 11
German Hide.....	12 @ 18
French.....	10 @ 10
Irish.....	15 @ 16
Low Grade.....	10 @ 12
Medium White.....	11 @ 17
Gum Shellac—	
Bleached, Commercial.....	35 @ 38
Bone Dry.....	44 @ 46
Buttton.....	40 @ 50
Diamond I.....	53 @ 55
Fine Orange.....	45 @ 50
A. C. Garnet.....	42 @ 43
G. A. L.....	35 @ 36
Kala Buttton.....	23 @ 25
D. C.....	56 @ 57
Octagon B.....	51 @ 52
T. N.....	33 @ 35
V. S. O.....	53 @ 55
Colors in Oil—	
Black, Lampblack.....	per lb. 12 @ 14
Blue, Chinese.....	36 @ 46

Blue, Prussian.....	per lb. 32 @ 36
Blue, Ultramarine.....	13 @ 16
Brown, Vandyke.....	11 @ 14
Green, Chrome.....	12 @ 16
Green, Paris.....	24 @ 24
Sienna, Raw.....	12 @ 15
Sienna, Burnt.....	12 @ 15
Umber, Raw.....	11 @ 14
Umber, Burnt.....	11 @ 14
White Lead, Zinc, &c.—	
Lead, English white, in Oil.....	10 1/2 @ 10 3/4
Lead, American White:	
Lots of 500 lb or over, in Oil.....	@ 7
Lots less than 500 lb, in Oil.....	@ 7 1/2
Lead, White, in oil, 25 lb tin	
pails, add to keg price.....	@ 1/4
Lead, White, in oil, 12 1/2 lb tin	
pails, add to keg price.....	@ 1
Lead, White, in oil, 1 to 5 lb	
ass'ted tins, add to keg price.....	@ 1 1/4
Lead, American, Terms: For lots 12	
tons and over 1/4 c rebate; and 2% for	
cash if paid in 15 days from date of	
invoice; for lots of 500 lbs. and over	
2% for cash if paid in 15 days from	
date of invoice, for lots of less than	
500 lbs. net.....	per lb.
Zinc, American, dry.....	5 1/2 @ 5 1/4
Zinc, French.....	5 1/2 @ 5 1/4
Antwerp, Red Seal, dry.....	10 1/2 @ 10 1/4
Antwerp, Green Seal, d.....	10 1/2 @ 10 1/4
Paris, Red Seal, dry.....	9 1/2 @ 9 1/4
Paris, Green Seal, dry.....	11 @ 11 1/2
Zinc, V. M. French, in Poppy Oil:	
Green Seal:	
Lots of 1 ton and over.....	13 1/4 @ 13 1/2
Lots of less than 1 ton.....	13 1/2 @ 13 3/4
Zinc, V. M. French, in Poppy Oil:	
Red Seal:	
Lots of 1 ton and over.....	11 1/4 @ 11 1/2
Lots of less than 1 ton.....	12 1/4 @ 12 1/2
Discounts—French Zinc—Discounts	
to buyers of 19 bbl. lots of one or mixed	
grades 1 1/4 to 2 1/2 bbls. 2 1/2 to 50 bbls. 4 1/2	
Dry Colors—	
Black, Carbon.....	per lb. 6 1/2 @ 10
Black Drop, American.....	3 1/4 @ 8
Black Drop, English.....	5 @ 15

Black, Ivory.....	per lb. 16 @ 20
Lamp, commercial.....	4 @ 6
Blue, Celestial.....	4 @ 4
Blue, Chinese.....	30 @ 33
Blue, Prussian.....	28 @ 32
Blue, Ultramarine.....	3 1/2 @ 5
Brown, Spanish.....	3 1/2 @ 5
Carmine, No. 40.....	\$1.00 @ 1.25
Green, Chrome, ordinary.....	3 1/2 @ 5
Green, Chrome, pure.....	17 @ 25
Lead, Red, bbls., 1/2 bbls., kegs.....	@ 7 1/4
Litharge, bbls., 1/2 bbls., kegs.....	@ 7 1/4
Ocher, American.....	per ton \$8.50 @ 16.00
American Golden.....	2 1/4 @ 3 1/4
French.....	1 1/4 @ 2
Foreign Golden.....	3 @ 4
Orange Mineral, English.....	10 @ 12
French.....	11 1/4 @ 12
German.....	10 @ 12
American.....	8 1/2 @ 9
Red, Indian, English.....	4 1/4 @ 6
American.....	3 @ 3 1/4
Red, Turkey, English.....	4 @ 10
Red, Tuscan, English.....	7 @ 10
Red, Venetian, Amer.....	per 100 lb \$0.50 @ 1.25
English.....	per 100 lb \$1.15 @ 1.60
Sienna, Italian, Burnt and	
Powdered.....	3 @ 9
Italian, Raw, Powdered.....	3 @ 7
American, Raw.....	1 1/4 @ 2
American Burnt and Pow'd.....	1 1/4 @ 2
Talc, French.....	per ton \$18.00 @ 25.00
American.....	per ton 15.00 @ 25.00
Terra Alba, French.....	per 100 lb .90 @ 1.00
English.....	.90 @ 1.00
American.....	per 100 lb. No. 1 .75 @ .80
American.....	per 100 lb. No. 2 .60 @ .65
Umber, Thick, Bot. & Pow'd.....	2 @ 3 1/4
Turkey, Raw and Powdered.....	2 1/4 @ 3 1/4
Burnt, American.....	1 1/4 @ 2
Raw, American.....	1 1/4 @ 2
Yellow Chrome, Pure.....	12 @ 14
Vermilion, American Lead.....	7 @ 25
Quicksilver, dark.....	@
English, Imported.....	@ 70
Chinese.....	per 100 lb \$0.90 @ 1.00

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33% @ 33% & 10% signifies

that the price of the goods in question ranges from 33% per cent. discount to 33% and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1907, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—"The Iron Age Standard Hardware Lists" contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Columbian and Domestic.....33%
North's.....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—See Caps, Cartridges, Shells, &c.

Anti-Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, 1/2 doz. pairs, No. 1, \$0.75; 2, \$0.60; 4, \$1.00; 5, \$0.50.
Fernald Quick Shifter, 1/2 doz. pairs.....\$2.00@3.00

Anvils—American—

Eagle Anvil.....@8%
Hay-Budden, Wrought.....@9%
Trenton.....@9%

Imported—

Peter Wright & Sons, 3/4 lb. to 345 lb. 11¢; 350 to 600 lb. 11¢.

Anvil, Vise and Drill—

Miller Falls Co., \$18.00.....15¢10%

Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Livingston Nail Co.....33%

Augers and Bits—

Com. Double Spur.....75¢@80%
Jennings' Patn., Bright.....65¢10%
Black Lip or Blued.....65¢65¢
Boring Mach. Augers.....70%
Car Bits, 12-in. twist.....40¢10%
Ford's Auger and Car Bits.....40¢5%
Ft. Washington Auger Co., Concord's Auger Bit.....35%
Forstner Pat. Auger Bits.....35%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list, 25¢7%
No. 30, R. Jennings' list.....50%
Russell Jennings.....35¢10%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....45%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....25%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60%
Snell's King Auger Bits.....50%
Wright's Jennings' Bits.....50%

Bit Stock Drills—

See Drills, Twist.

Expansive Bits—

Clark's Pattern, No. 1, 1/2 doz. 32¢;
No. 2, 18.....60¢10%
Ford's, Clark's Pattern.....66¢45%
C. E. Jennings & Co. Steer's Pat. 25%
Lavigne Pat., small size, \$18.00; large size, \$26.00.....60¢10%
Swan's.....60%

Gimlet Bits—

Common Dble. Cut.....\$3.00@3.25
German Pattern, Nos. 1 to 10, \$4.75; 11 to 13, \$5.75

Hollow Augers—

Bonney Pat., per doz. \$5.50@7.00
Ames.....25¢10%
Universal.....20%

Ship Augers and Bits—

Ship Augers.....40¢10%
Ford's.....35¢45%
C. E. Jennings & Co.:
L'Hommedieu's.....6%
Watrous'.....33¢47%
Snell's.....48%

Awl Hafts—See Handles, Mechanics' Tool.

Awls—

Brad Awls:
Handled.....gro. \$2.75@3.00
Unhanded, Shlivered.....gro. \$3.65@4.00
Unhanded, Patent.....gro. \$6.00@7.00

Peg Awls—

Unhanded, Patent.....gro. \$1.50@1.75
Unhanded, Shlivered.....gro. \$3.65@4.00
Scratch Awls:
Handled, Com.....gro. \$3.50@4.00
Handled, Socket.....gro. \$11.50@12.00

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Single Bit, base weights: Per doz.
First Quality.....\$4.75@5.00
Second Quality.....\$4.25@4.50

Double Bit, base weights:

First Quality.....\$7.00@7.50
Second Quality.....\$6.50@6.75

Axle Grease—

See Grease, Axle

Axles—

Concord, Loose Collar.....4 1/2¢@5¢
Concord, Solid Collar.....4 1/2¢@5¢
No. 1 Common, Loose.....3 1/2¢@4 1/2¢
No. 1 1/2 Com., New Style.....4 1/2¢@5¢
No. 2 Solid Collar.....4 1/2¢@5¢
Half Patent:
Nos. 7, 8, 11 and 12.....65¢@65¢10%
Nos. 13 to 14.....65¢@65¢10%
Nos. 15 to 18.....70¢@70¢10%
Nos. 19 to 22.....70¢@70¢10%

Boxes, Axle—

Common and Concord, not turned lb., 5¢@6¢

Common and Concord, turned lb., 6¢@7¢

Half Patent.....lb., 9¢@10¢

Bait—

Fishing—

Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20¢5%

Balances—

Sash—

Caldwell new list.....50%
Pullman.....50¢10¢60%

Spring—

Spring Balances.....50¢10¢60%
Chattillon's:
Light Spg. Balances.....50¢50¢10%
Straight Balances.....40¢40¢10%
Circular Balances.....50¢10%
Large Dial.....30%

Barb Wire—See Wire, Barb.

Bars—

Crow—

Steel Crowbars, 10 to 40 lb. per lb., —@2 1/2¢
Towel
No. 10 Ideal, Nickel Plate.....@gro. \$2.50

Beams, Scale—

Scale Beams.....40%
Chattillon's No. 1.....30%
Chattillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered 1/2 doz. \$0.80;
Tinned.....\$0.85
No. 11 Wire Coppered 1/2 doz. \$1.15;
Tinned.....\$1.20
No. 10 Wire Tinned.....1/2 doz. \$1.50

Beaters, Egg—

Holt-Lyon Co.:
Holt, per doz., No. 5, Jap'd, \$0.80;
No. A, Jap'd, \$1.15; No. B, Jap'd, \$1.85; No. 6, Jap'd, \$1.65.
Lyon, Jap'd, per doz., No. 2, \$1.35.
Taplin Mfg. Co.:
Improved Beaver, per gro., No. 60, \$6.00; No. 75, \$6.50; No. 100, \$7.00;
No. 102, Tin'd, \$8.50; No. 150, Hotel, \$15.00; No. 152, Hotel Tin'd, \$17.00; No. 200, Tumbler, \$3.50; No. 202, Tumbler Tin'd, \$9.50; No. 300, Mammoth, per doz., \$25.00.
Turner & Seymour Mfg. Co.:
T. & S. Dover.....\$6.50

Bellows—

Blacksmith, Standard List:
Split Leather.....60¢10¢65%
Grain Leather.....50¢50¢10%

Hand—

Inch.....6 7 8 9 10
Doz. \$5.00 5.50 6.00 6.50 7.50

Molders—

Inch.....10 12 14 16
Doz. \$7.50 9.00 12.00 15.00

Bells—

Cow—

Ordinary Goods.....75¢@75¢10¢5%
High grade.....70¢10¢75%
Jersey.....75¢10%
Texas Star.....50%

Door—

Home, R. & E. Mfg. Co.'s.....55¢10%

Hand—

Polished, Brass.....50¢50¢10%
White Metal.....50¢50¢5%
Nickel Plated.....50%
Sticks.....50%
Cone's Globe Hand Bells.....33¢@36%

Miscellaneous—

Farm Bells.....lb., 2 1/2¢@2 1/2¢
Church and School.....60¢@60¢5%

Belting—

Leather—

Extra Heavy, Short Lap.....60¢5%
Regular Short Lap.....60¢10¢5%
Standard.....70¢5%
Light Standard.....75%
Cut Leather Lacing.....40¢10%
Leather Lacing Sides, per sq. ft. 2 1/2¢

Rubber—

Agricultural (Low Grade).....75¢75¢5%
Common Standard.....70¢70¢10%
Standard.....70¢70¢5%
Extra.....60¢5¢60¢10%
High Grade.....60¢5¢60¢10%

Bench Stops—

See Stops, Bench

Benders and Upsetters, Tire—

Green River Tire Benders and Upsetters.....20%

Bicycle Goods—

John S. Leng's Son & Co.'s 1907 list:
Chain, Parts, Spokes.....50%
Tubes.....60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See Augers and Bits.

Blocks—

Tackle—

Common Wooden.....75%
B. & L. B. Co.:
Barton Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50¢10%
Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50¢10%; Wire Rope Snatch, 50%
Lape's Patent Automatic Lock and Junior.....30%
See also Machines, Hoisting.

Boards, Stove—

Paper and Wood Lined.....40%
Embossed.....50%

Boards, Wash—

See Washboards.

Bobs, Plumb—

Keuffel & Esser Co.....33%45%

Bolts—

Carriage, Machine, &c.—

Common Carriage (cut thread):
1/2 x 6 and smaller.....70¢50%
Larger and longer.....65¢
Phila. Eagle, \$3.00 list.....80¢
Bolt Ends.....65¢50%
Machine (Cut Thread):
1/2 x 4 and smaller.....70¢75¢
Larger and longer.....65¢50%

Door and Shutter—

Cast Iron Barrel, Japanned, Round Brass Knob:
Inch.....3 4 5 6 8
Per doz. \$3.50 3.50 4.50 6.00 8.00
Cast Iron Spring Foot, Jap'd:
Inch.....6 8 10
Per doz. \$1.20 1.50 2.25
Cast Iron Chain, Flat, Japanned:
Inch.....6 8 10
Per doz. \$1.00 1.40 1.65
Cast Iron Flat Shutter, Jap'd, Brass Knobs:
Inch.....6 8 10
Per doz. \$0.75 95 1.25
Wrought Barrel Jap'd.....80¢@80¢10%
Barrel Bronzed.....60¢10%
Spring.....70¢10¢70¢10%
Shutter.....50¢5¢50¢10¢45%
Square Neck.....75¢75¢10%
Square.....70¢10¢10%

Ives' Patent Door.....55%
Ives' Wrought Metal.....45%

Expansion—

Richards Mfg. Co.....50¢10%

Plow and Stove—

Plow.....65¢5¢@—%
Stove.....85¢@85¢5%

Tire—

Common Iron.....90%
Norway Iron.....80%
American Screw Company:
Norway Phila. list Oct. 18, '94.....80%
Eagle Phila. list Oct. 18, '94.....82%
Bay State, list Dec. 23, '99.....80%
Franklin Moore Co.:
Norway Phila. list Oct. 18, '94.....80%
Eagle Phila. list Oct. 18, '94.....82%
Eclipse, list Dec. 23, '99.....80%
Russell, Burdall & Ward Bolt & Nut Co.:
Empire, list Dec. 23, '99.....80%
Norway Phila. list Oct., '94.....80%
Eagle.....82%
Shelton Co.:
Tiger Brand, list Dec. 23, '99.....80%
Phila., Eagle, list Oct. 18, 1881.....82%
Upon Nut Co.:
Tire Bolts.....72%4%

Borers, Bung—

Borers Bung, Ring, with Handle:
Inch.....1 1/4 1 1/2 1 3/4 2
Per doz. \$4.80 5.60 6.40 8.00
Inch.....2 1/4 2 1/2 2 3/4 3
Per doz. \$8.65 11.50
Enterprise Mfg. Co., No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.50 each.....25%

Boxes, Mitre—

C. E. Jennings & Co.....25%
Langdon, New Langdon and London Improved, 20¢10%; Langdon Acme.....15¢10%
Perfection.....40%
Seavey.....45%

Braces—

Common Ball, American.....\$1.50
Barber's.....50¢10¢60¢10%
Fray's Genuine Spoodford.....60%
Fray's No. 70 to 120, 81 to 123, 207 to 414.....60%
C. E. Jennings & Co.....50¢5%
Mayhew's Hatchet.....50%
Mayhew's Quick Action Hay Pat.....50%
Miller Falls Drill Braces.....75¢75¢10%
P. S. & W. Co., Peck's Pat. 60¢10%

Brackets—

Wrought Steel.....70¢10¢75¢10%
Bradley Metal Clasp, 30¢10¢80¢10¢5%
Griffin's Pressed Steel.....75¢75¢10%
Griffin's Folding Brackets.....70¢10%
Taplin Victor Handy Egg Beater Bracket.....1/2 doz. \$1.50

Bright Wire Goods—

See Wire and Wire Goods.

Broilers—

Kilbourne Mfg. Co.....75¢20%
Wire Goods Co.....75%

Buckets, Galvanized—

M'fgr's list, price per gross:
Quart. 10 12 14
Water, Reg.....25.35 28.00 32.00
Water, Hvn.....45.35 48.00 52.00
Fire, Rd. Btm.....32.00 34.65 38.65
Well.....37.35 41.35 45.35

Bull Rings—See Rings, Bull

Butts—

Brass—

Wrought, High List, Oct. 26, '06, 45¢@45¢10%

Cast Brass, Tiebout's.....40%

Cast Iron.....40%

Fast Joint, Broad.....40¢10¢50%
Fast Joint, Narrow.....40¢10¢50%
Loose Joint.....70¢10¢75%
Loose Pin.....70¢10¢75%
Mayer's Hinges.....70¢70¢5%
Parliament Butts.....70¢70¢5%

Wrought Steel—

Discount:
Reversible and Broad.....70¢5%
Light Reversible, Light Narrow.....70¢5%
Loose Joint, Narrow, Light Inside Blind, etc.....70%
Back Flaps, Table Chest.....65%

Cages, Bird—

Hendryx Brass: Series 3000, 5000, 1100, net list: 1200, 15%; 200, 300, 900.....30%

Hendryx Bronze; Series 700, 800, 30%

Hendryx Enamelled.....35%

Calipers—See Compasses.**Calks, Toe and Heel—**

Blunt, 1 prong, per lb., 4 1/4 @ 4 1/4¢
 Sharp, 1 prong, per lb., 4 1/4 @ 5 1/4¢
 Burke's, Blunt, 4 @ 1/4¢; Sharp, 4 @ 5/4¢
 Lautier, Blunt, 4 @ 1/4¢; Sharp, 4 @ 5/4¢
 Perkins, Blunt, 1 lb, 3.65¢; Sharp, 4.15¢

Can Openers—

See Openers, Can.

Caps, Percussion—

Eley's E. B. 50 @ 55¢
 G. D. per M 54 @ 55¢
 F. L. per M 40 @ 42¢
 G. E. per M 48 @ 50¢
 Musket per M 68 @ 63¢

Primers—

Berdan Primers, \$2 per M. 20¢
 Primer Shells and Bullets, 15¢ @ 10%
 All other primers per M. \$1.52 @ 1.60

Carpet Stretchers—

See Stretchers, Carpet.

Cartridges—

Blank Cartridges:
 32 U. F., \$5.50 10¢ @ 5%
 38 U. F., \$7.00 10¢ @ 5%
 22 cal. Rim, \$1.50 10¢ @ 5%
 32 cal. Rim, \$2.75 10¢ @ 5%
 B. B. Caps, Con. Ball, Sued. \$1.49
 B. B. Caps, Round Ball \$1.49
 Central Fire 25¢
 Target and Sporting Rifle, 15¢ @ 10%
 Primer Shells and Bullets, 15¢ @ 10%
 Rim Fire, Sporting 50¢
 Rim Fire, Military 15¢ @ 5%

Castors—

Bed 65¢ @ 10%
 Plate 60¢ @ 5%
 Philadelphia 70¢ @ 10%
 Acme Ball Bearing 35¢
 Gem Ball Bearing 70¢ @ 10%
 Steel Gem 25¢
 Standard Ball Bearing 20¢
 Yale (Double Wheel) low list, 10¢ @ 10%

Cattle Leaders—

See Leaders, Cattle.

Chain, Proof Coil—

American Coil, Straight Link:
 5-16 1/4 5-16 3/4 7-16 1/2 9-16
 \$8.77 6.17 5.02 4.57 4.37 4.27 4.22
 5/16 3/4 7/8 to 1 1 1/4 to 1 1/2 inch.
 \$4.17 4.07 4.02 4.12
 In case lots, deduct 25¢.
German Coil:
 6-0 to 1 70¢ @ 10%
 2 and 3 60¢ @ 10%
 4, 5 and 6 50¢ @ 10%

Halter—

Halter Chains 60¢ @ 60¢ @ 5%
 German Pattern Halter Chains
 List July 24, '07 60¢ @ 10%
 Covert Mfg. Co. 35¢ @ 5%
 Halter 35¢ @ 5%

Cow Ties—

See Halters and Ties.

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
 6 1/2-6-3, Straight, with ring, \$28.00
 6 1/2-6-2, Straight, with ring, \$29.00
 6 1/2-8-2, Straight, with ring, \$32.00
 6 1/2-10-2, Straight, with ring, \$37.00
 NOTE.—Add 2¢ per pair for Hooks.
 Twist Traces: add per pair for Nos. 2 and 3, 2¢; No. 1, 3¢; No. 4, 4¢ to price of Straight Link.

Eastern Standard Traces, Wagon Chain, etc. 60¢ @ 10%
 Miscellaneous—

Jack Chain, list July 10, '93:
 Iron 60¢ @ 10%
 Brass 60¢
 Safety and Plumbers' Chain, 60¢ @ 10%
 Gal. Pump Chain 1/2 lb. 4 1/2 @ 4 1/4¢
 Covert Mfg. Co.:
 Breast, Halter, Heel, Rein, Stalion 40¢
 Oneida Community:
 American Halter, Dog and Kennel Chains 35¢ @ 25¢ @ 40%
 Niagara Dog Leads and Kennel Chains 45¢ @ 50¢ @ 5%
 Wire Goods Co.:
 Dog Chain 70¢
 Universal Dbl.-Jointed Chain 50¢

Chain and Ribbon, Sash—

Oneida Community:
 Steel Chain 60¢
 Pullman:
 Bronze Chain, 60%; Steel Chain, 60¢ @ 10%
 Sash Chain Attachments, per set, 2¢
 Aluminum Sash Ribbon, per 100 ft. \$1.25 @ 33.00
 Sash Ribbon Attachments, per set, 8¢

Chalk—(From Jobbers.)

Carpenters' Blue gro., 50¢ @ 55¢
 Carpenters' Red gro., 45¢ @ 50¢
 Carpenters' White gro., 40¢ @ 45¢

Checks, Door—

Bardley's 45¢
 Pullman, per gro. \$5.40
 Russwin 35¢ @ 10%

Chests, Tool—

American Tool Chest Co.:
 Boys' Chests, with Tools 50%
 Youths' Chests, with Tools 25%
 Gentlemen's Chests, with Tools 25%
 Farmers', Carpenters', etc., Chests, with Tools 20%
 Machinists' and Pipe Fitters' Chests, Empty 45%
 Tool Cabinets 45%
 C. E. Jennings & Co.'s Machinists' Tool Chests 7 1/2%

Chisels—

Socket Framing and Firmer Standard List 75¢ @ 10%
 Buck Bros. 30%
 C. E. Jennings & Co.:
 Socket Firmer No. 10 25¢ @ 7 1/2%
 Socket Framing No. 15 25¢ @ 7 1/2%
 Swan's 66¢ @ 70%
 L. & I. J. White Co. 30¢ @ 35%

Tanged—

Tanged Firmers 30¢ @ 35%
 Buck Bros. 30%
 C. E. Jennings & Co. Nos. 191, 181 25¢ @ 5%
 L. & I. J. White Co. 25¢ @ 5%

Cold—

Cold Chisels, good quality, 13¢ @ 15¢
 Cold Chisels, fair quality, 11¢ @ 12¢
 Cold Chisels, ordinary, 9¢ @ 10¢

Chucks—

Almond Drill Chucks 35%
 Almond Turret Six-Tool Chuck 40%
 Beach Pat., each \$8.00 35¢ @ 5%
 Empire 25%
 Blacksmith's 35%
 Jacobs' Drill Chucks 35%
 Pratt's Positive Drive 25%
 Skinner Patent Chucks:
 Independent Lathe Chucks 35%
 Universal, Reversible Jaws 35%
 Combination, Reversible Jaws 35%
 Drill Chucks, New Model, 25%
 Standard, 45%
 Skinner Pat. 25%
 Positive Drive 40%
 Planer Chucks 30%
 Face Plate Jaws 35%
 Standard Tool Co.:
 Improved Drill Chuck 45%
 Union Mfg. Co.:
 Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; No. 21 35%
 Scroll Combination, Nos. 83 and 81 30%
 Geared Scroll, Nos. 33, 34 and 35 25%
 Independent Iron, Nos. 18 and 19 35%
 Independent Steel, No. 64 35%
 Union Drill, Nos. 000, 00, 100, 101, 102, 103, 104 35%
 Union Car Drill 25%
 Universal, 11, 12, 16, 17, 13, 14, 15, 40%
 Universal, No. 42 35%
 Iron Face Plate Jaws, Nos. 28, 30, 48 and 50 35%
 Steel Face Plate Jaws, Nos. 70 and 72 30%
 Westcott Patent Chucks:
 Lathe Chucks 50%
 Little Giant Auxiliary Drill 50%
 Little Giant Double Grip Drill 50%
 Little Giant Drill, Improved 50%
 Oneida Drill 50%
 Scroll Combination Lathe 50%

Clamps—

Adjustable, Hammers' 20¢ @ 20¢ @ 5%
 Carriage Makers', P. S. & W. Co. 50¢ @ 10%
 Reels 35¢ @ 10%
 Myers' Hay Rack 45¢
 Lineman's Swedish Nevertum 65¢
 Wood Workers, Hammers' 40¢ @ 10%
 Saw Clamps, see Vices, Saw Filers'

Cleaners, Drain—

Iwan's Champion, Adjustable 50%
 Iwan's Champion, Stationary 40%

Sidewalk—

Star Socket, All Steel, 3/4 doz. \$4.05 net
 Star Shank, All Steel, 3/4 doz. \$3.24 net
 W. & C. Shank, All Steel, 3/4 doz., 7 1/2 in., \$3.00; 8 in., \$3.25

Cleavers, Butchers—

Foster Bros. 30%
 Fayette R. Plumb 30%
 L. & I. J. White Co. 30%

Clippers, Horse and Sheep—

Chicago Flexible Shaft Company:
 1902 Chicago Horse, each, \$10.75
 20th Century Horse, each, \$5.00
 Lightning Belt Horse, each, \$15.00
 Chicago Belt Horse, each, \$29.00
 Stewart's Enclosed Gear, \$4.75
 Stewart's Patent Sheep Shearing Machine, each, \$12.75
 Stewart Enclosed Gear Shearing Machine, No. 8, each, \$9.75

Clips, Axle—

Regular Styles, list July 1, '05, 80¢ @ 40¢ @ 10%

Cloth and Netting, Wire—

See Wire, etc.

Cocks, Brass—

Hardware list:
 Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, etc. 70¢ @ 7%
 Compression Bibbs, 60¢ @ 10%
Coffee Mills—
 See Mills, Coffee.

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list 40%
 Leather, Walter B. Stevens & Son's list 40%

Compasses, Dividers, &c.—

Ordinary Goods 70¢ @ 10%
 Wm. Schollhorn Co.:
 Excelsior Dividers 60%
 Lodi Dividers 70¢ @ 10%

Conductor Pipe,—

L. C. L. to Dealers:

	Galv. Steel.	Galvanized Charcoal Iron.	Copper.
Eastern:	70%	50¢ @ 17 1/2%	30¢ @ 10%
Central:	70%	60%	30¢ @ 10%
Western and Southern:	70%	55¢ @ 5%	30¢ @ 7 1/2%
No. Western:	65¢ @ 5%	50¢ @ 5%	30¢ @ 5%

Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered.
 See also Eave Troughs.

Coolers, Water—

L. & O. Mfg. Co.:
 Gal. 2 3 4 6 8
 Galvanized, ea. \$1.85 \$2.00 \$2.25 \$2.90 \$3.90
 Galvanized, Lined, side handles,
 Gal. 2 3 4 6 8
 Each \$1.95 \$2.15 \$2.40 \$3.30 \$4.15
 White Enamelled 10%
 Agate Lined 10%

Coopers' Tools—

See Tools, Coopers'.

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair and heavier, 30¢ @ 35¢; lighter than 3 lb. to pair 32¢ @ 35¢

Cord— Sash—

Braided, Drab lb. 35¢
 Braided, White, Com., Nos. 8 to 12, 26¢; No. 7, 26 1/2¢; No. 6, 27 1/2¢.
 Cable Laid Italian, lb., No. 18, 37¢
 Italian, lb., A. No. 18, 25¢; B, 22¢
 Common India lb., 11¢ @ 11 1/2¢
 Cotton Sash Cord, Twisted, 18¢ @ 20¢
 Patent Russia lb. 30¢
 Cable Laid Russia lb. 21¢
 India Hemp, Br'd'd lb. 21¢
 India Hemp, Twisted lb. 13¢ @ 14¢
 Patent India, Twisted lb. 17¢
 Pearl Braided cotton, No. 6, 3/4 lb, 27 1/2¢; No. 7, 26 1/2¢; Nos. 8 to 12, 26¢
 Eddystone, Braided, Nos. 8 to 12, 26¢; 7, 26 1/2¢; 6, 27 1/2¢.
 Harmony Cable Laid Italian, Nos. 1 to 10 10¢ @ 23¢
 Pines 10%
 Waxed Sash Cord 10%
 Sash Cord Attachments, per doz. 10%
 Samson, Nos. 8 to 12:
 Braided, 3/4 lb., Drab Cotton, 55¢; Italian Hemp, 40¢ @ 50¢; Linen, 65¢; White Cotton, 50¢; Spot Cord 50¢
 Massachusetts, White, 3/4 lb. 45¢
 Phoenix, White, Nos. 8 to 12, 27¢
 Silver Lake, per lb.:
 A, Drab, 45¢; A, White, 40¢;
 B, Drab, 40¢; B, White, 35¢;
 Italian Hemp, 40¢; Linen, 57 1/2¢
 See also Chain and Ribbon.

Wire, Picture—

List July 10, 1906 90¢ @ 10%
 Hendryx Standard Wire Picture Cord, old list, 85¢ @ 10%
 Turner & Stanton Co. Wire Picture Cord 85¢ @ 10%

Cradles—

Grain 40¢ @ 15% @ 5%

Crayons—

White Round Crayons, Cases, 100 gro., \$6.50 @ \$7.50 at factory, but lower prices made by jobbers
 Zehnicks Lumber, 3/4 gro.
 White and Purple, Indelible, \$7.50
 Blue, Red, Green, Yellow and Terra Cotta, \$6.50; Black, \$4.00
 Giant Lumber, 5/4 in. x 15-16 in. round, all colors, \$16.25; Indelibles \$18.75
 Genuine Soapstone, Metal Workers', 5 in. x 3/4 in. Round, \$2.50; 5 in. x 1/4 in. Square, \$1.75; 5 x 1/4 x 3-16, \$2.50; 5 x 1/4 x 3-16 \$3.00

Crooks, Shepherds—

Fort Madison, per doz., Heavy, \$5.50; Light \$5.00

Crow Bars—See Bars, Crow.**Cultivators—**

Victor Garden 50%

Cutlery, Table—

International Silver Company:
 No. 12 M'd'm Knives, 1817, 3/4 doz. \$3.50
 Star, Eagle, Rogers & Hamilton and Anchor 3/4 doz. \$3.00
 Wm. Rogers & Son 3/4 doz. \$2.50

Cutters— Glass—

H. H. Mayhew Co. 40%
 Red Devil 60%
 B. Mfg. Co. 40%
 Woodward 50%

Meat and Food—

American 30%
 Nos. 401 402 403 404 405 406 407
 Each \$5 \$7 \$10 \$12 \$25 \$50 \$60
 Enterprise:
 Nos. 5 10 12 22 32
 Each \$2 \$3 \$2.75 \$1.50 \$6 \$25 @ 25¢ @ 7 1/2%
 No. 202, \$1.50 40¢ @ 7 1/2%
 P. S. & W. Co.:
 Dixon's 3/4 doz. 33 1/2%
 Nos. 1 2
 Ideal \$11.00 \$17.00 \$19.00 \$30.00
 Hales 40¢ @ 10% @ 5%
 Little Giant 3/4 doz. 40¢ @ 50%
 Nos. 305 310 312 320 322
 \$35.00 \$48.00 \$44.00 \$72.00 \$68.00
 New Triumph No. 605, 3/4 doz. \$24.00, 40¢ @ 10%
 Russwin Food, No. 1, \$24.00; No. 2, \$27.00 45¢ @ 10%
 Enterprise Beef Shavers 25¢ @ 30%

Slaw and Kraut—

Henry Diston & Sons:
 Slaw and Kraut Cutters 35%
 Corn Graters 30%
 J. M. Mast Mfg. Co.:
 Slaw Cutters, 1 Knife, 3/4 doz. \$3.00
 Combined Slaw Cutter and Corn Grater 3/4 doz. \$4.00

Tobacco—

All Iron, Cheap, doz. \$4.85 @ \$4.50
 Enterprise 25¢ @ 30%
 National, 3/4 doz., No. 1, \$21; No. 2, \$18 40%

Diggers, Post Hole, &c.—

Diston's:
 Rapid, 3/4 doz., \$24.00 25%
 Samson, 3/4 doz., \$34.00 25%
 Iwan's Imp'd Post Hole Auger, 40%
 Vaughan Pattern Post Hole Augers, 3/4 doz., \$7.00
 Perfection Post Hole Diggers, 3/4 doz., \$8.75
 Split Handle Post Hole Diggers, 3/4 doz., \$7.75
 Hercules Pattern, 3/4 doz., \$10.00
 Kohler's, 3/4 doz., Universal, \$15.00;
 Little Giant, \$12.00; Hercules, \$10.00; Invincible, \$9.00; Rival, \$8.50; Pioneer \$7.50
 Never-Break Post Hole Diggers, 3/4 doz., \$24.00 60%

Dividers—See Compasses.**Drawing Knives—**

See Knives, Drawing.

Dressers, Emery Wheel—

Sterling Emery Wheel Dressers 35%
 Sterling Wheel Dresser Cutters 35%

Drills and Drill Stocks—

Blacksmiths' Common Drilling Machines \$1.50 @ \$1.75
 Breast, Millers Falls 10¢ @ 10%
 Breast, P. S. & W. 33 1/2%
 Goodell Automatic Drills, 50¢ @ 10¢ @ 10%
 Millers Falls Automatic Drills, 33¢ @ 10%
 Hatchet, Curtis & Curtis 25%
 Hatchet, Parker's 40%
 Hatchet, Weston's 40%
 Hatchet, Weston's, Style H Improved 40%
 Hatchet, No. 12 40%
 Hatchet, Celebrated 40%
 Hatchet, Whitney's, P. S. & W. 50¢ @ 5%
 Whitney's Hand Drill, No. 1, \$10.00; Adjustable, No. 10, \$12.00 33 1/2%

Twist Drills—

Bit Stock 60¢ @ 10¢ @ 10% @ 70%
 Taper and Straight Shank 60¢ @ 10¢ @ 60¢ @ 10¢ @ 5%

Drivers, Screw—

Screw Driver Bits, per doz. 45¢ @ 50¢
 Balsey's Screw Holder and Driver, 3/4 doz., 2 1/2-in., \$6; 4-in., \$7.50; 6-in., \$9 50%
 Buck Bros. Screw Driver Bits 50%
 Champion 70%
 Diston's 70%
 Fray's Hol. H'die Sets, No. 3, \$12.50
 Ford's Brace Screw Drivers 40¢ @ 10%
 Gay's Double Action Hatchet 35%
 Goodell's Auto 65¢ @ 65¢ @ 10%
 Mayhew's Black Handle 40%
 Mayhew's Monarch 40%
 Millers Falls, Nos. 20 and 21 25¢ @ 10%
 Millers Falls, Nos. 11, 12, 41, 42, 15¢ @ 10%
 Smith & Hemenway Co., Neverturn, 66%; Elmora, 60%; Star, 50¢ @ 10%
 Swan's:
 Nos. 1565 to 1568, 50%; No. 7540, 40¢ @ 10%

Eave Trough, Galvanized—

Territory. L. C. L. Galvanized Galv. Charcoal Copper. Iron. 1 1/2, 16¢ @ 20 oz.

Eastern:

70¢ @ 30%
 Central: 70¢ @ 30%
 Western and Southern: 70¢ @ 30%
 So. Western: 70¢ @ 30%
 75¢ @ 7 1/2%
 65¢ @ 5%
 30¢ @ 5%

Terms.—2% for cash. Factory ship

ments generally delivered.
 See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory ship ments, all territories: Galv. Steel and Galv. C. I. Standard Gauge 80%
 No. 26 50%
 No. 28 35%
 No. 22 10%
 Copper 50¢ @ 10%

Elbows, Stove Pipe—

Edwards, Standard Blue 40¢ @ 10¢ @ 10%
 Edwards, Royal Blue 40¢ @ 10¢ @ 10%
 Reeves, Dover, one piece 40¢ @ 10%

Emery, Turkish—

4 to 5 1/2 to 220: Flour.

1/2 Keps 10. 5 1/2 5 1/2 5 1/2
 1/4 Keps 10. 5 1/2 5 1/2 5 1/2
 1/8 Keps 10. 5 1/2 5 1/2 5 1/2
 10-lb. cans, 7 1/2 7 1/2 7 1/2
 10-lb. cans, less than 10 10 10 10 10
 Less quantity, 10 10 10 10

NOTE.—In lots 1 to 3 tons a discount

of 10% is given.

Extractors, Lemon Juice

—See Squeezers, Lemon.

Fasteners, Blind—

Zimmerman's 50¢@10¢
 Wailing's 40¢@10¢
 Upon's Patent 40¢

Cord and Weight—

Ives and Titan 33½%

Faucets—

Cork Lined 50¢@10¢@60¢
 Metallic Key, Leather Lined 60¢@10¢@70¢

Red Cedar 40¢@10¢@40¢@75¢
 Petroleum 70¢@10¢@75¢

L. & L. B. Co.: 60¢@10¢

Star 60¢@10¢

West Lock 60¢@10¢

John Sommer's Portless Tin Key 40¢

John Sommer's Boss Tin Key 50¢

John Sommer's Victor Mtl. Key 50¢@10¢

John Sommer's Duplex Metal Key 60¢

John Sommer's Diamond Lock 60¢

John Sommer's I. X. L. Cork Lined 50¢

John Sommer's Reliable Cork Lined 50¢@10¢

John Sommer's Chicago Cork Lined 60¢

John Sommer's O. K. Cork Lined 50¢

John Sommer's No Brand, Cedar 50¢

John Sommer's Perfection, Cedar 40¢

Self Measuring 40¢@10¢

Enterprise, ½ doz. \$36.00 40¢@10¢

Lane's, ½ doz. \$36.00 40¢@10¢

National Measuring, ½ doz. \$36.00 40¢@10¢

Felloe Plates—

—See Plates, Felloe.

Files— Domestic—

List Nov. 1, 1899.

Best Brands 70¢@10¢@75¢@10¢

Standard Brands 75¢@10¢@80¢

Lower Grade 75¢@10¢@80¢@10¢

Imported—

Stubbs' Tapers, Stubbs' list, July 24, '97 33 1-3@10¢

Fixtures, Fire Door—

Allith Underwriters' Approved 50%

Richards Mfg. Co.: 104

Universal, No. 103; Special, No. 104 33.75

Possible Links, No. 96 60%

Expansion Bolts, No. 107 60¢@10¢

Grindstone—

Net Prices: 15 17 19 21

Per doz. \$3.60 3.85 4.45 4.65

P. S. & W. Co. 25%

Leading Hardware Co. 60%

Fodder Squeezers—

—See Compressors.

Forks—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Iowa Dig-Ezy Potato 60¢@10¢

Victor, Hay 60¢@15¢@24¢

Victor, Manure 60¢@15¢@24¢

Victor, Header 60¢@15¢@24¢

Champion, Hay 60¢@15¢@24¢

Champion, Header 60¢@15¢@24¢

Champion, Manure 60¢@15¢@24¢

Columbia, Hay 60¢@15¢@24¢

Columbia, Manure 60¢@15¢@24¢

Columbia, Spading 60¢@15¢@24¢

Hawkeye Wood Barley 60¢@15¢@24¢

W. & C. Potato Digger 60¢@15¢@24¢

Acme Hay 60¢@15¢@24¢

Acme Manure, 4 time 60¢@15¢@24¢

Dakota Header 60¢@15¢@24¢

Jackson Steel Barley 60¢@15¢@24¢

Kansas Header 60¢@15¢@24¢

W. & C. Favorite Wood Barley 60¢@15¢@24¢

Plated.—See Spoons.

Frames— Wood Saw—

White, S'g't Bar, per doz. 75¢@80¢

Red, S'g't Bar, per doz. \$1.00@1.25

Red, Dbl. Brace, per doz. \$1.40@1.50

Freezers, Ice Cream—

Qt. 1 2 3 4 5

Each \$1.25 \$1.60 \$1.90 \$2.20 \$2.50

Fruit and Jelly Presses—

—See Presses, Fruit and Jelly.

Fry Pans— See Pans, Fry.**Fuse— Per 1000 Feet.**

Hemp \$2.75

Cotton 3.20

Waterproof Sgl. Taped. 3.65

Waterproof Dbl. Taped. 4.40

Waterproof Tpl. Taped. 5.15

2¢@10¢

3¢@10¢

4¢@10¢

5¢@10¢

6¢@10¢

7¢@10¢

8¢@10¢

9¢@10¢

10¢@10¢

11¢@10¢

12¢@10¢

13¢@10¢

14¢@10¢

15¢@10¢

16¢@10¢

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90¢@10¢

91¢@10¢

92¢@10¢

93¢@10¢

94¢@10¢

95¢@10¢

96¢@10¢

97¢@10¢

98¢@10¢

99¢@10¢

100¢@10¢

Glasses, Level—

Chapin-Stephens Co. 65¢@65¢@10%

Glue, Liquid Fish—

Bottles or Cans, with Brush 25¢@10¢@50%

Elwell's 40%

Grease, Axle—

Common Grade gro. \$6.00@6.50

Dixon's Everlasting, 10-lb. pails, ea. 5¢; in boxes, ½ doz., 1 lb. \$1.20;

2 lb. \$2.00

Helmet Hard Oil 25%

Griddles, Soapstone—

Pike Mfg. Co. 33½¢@33½¢@10%

Grinders—

Royal Mfg. Co.: 30%

Aluminum Grinding Machines, each, Nos. 01, \$1.75; 1A, \$2.50; 10, \$5.00; 20, \$5.00; 20A, \$6.00; 20A Combined, \$6.50; 30, \$7.50; 40, \$8.50; 50, \$9.50; 60, \$10.50; 70, \$11.50; 80, \$12.50; 90, \$13.50; 100, \$14.50; 110, \$15.50; 120, \$16.50; 130, \$17.50; 140, \$18.50; 150, \$19.50; 160, \$20.50; 170, \$21.50; 180, \$22.50; 190, \$23.50; 200, \$24.50; 210, \$25.50; 220, \$26.50; 230, \$27.50; 240, \$28.50; 250, \$29.50; 260, \$30.50; 270, \$31.50; 280, \$32.50; 290, \$33.50; 300, \$34.50; 310, \$35.50; 320, \$36.50; 330, \$37.50; 340, \$38.50; 350, \$39.50; 360, \$40.50; 370, \$41.50; 380, \$42.50; 390, \$43.50; 400, \$44.50; 410, \$45.50; 420, \$46.50; 430, \$47.50; 440, \$48.50; 450, \$49.50; 460, \$50.50; 470, \$51.50; 480, \$52.50; 490, \$53.50; 500, \$54.50; 510, \$55.50; 520, \$56.50; 530, \$57.50; 540, \$58.50; 550, \$59.50; 560, \$60.50; 570, \$61.50; 580, \$62.50; 590, \$63.50; 600, \$64.50; 610, \$65.50; 620, \$66.50; 630, \$67.50; 640, \$68.50; 650, \$69.50; 660, \$70.50; 670, \$71.50; 680, \$72.50; 690, \$73.50; 700, \$74.50; 710, \$75.50; 720, \$76.50; 730, \$77.50; 740, \$78.50; 750, \$79.50; 760, \$80.50; 770, \$81.50; 780, \$82.50; 790, \$83.50; 800, \$84.50; 810, \$85.50; 820, \$86.50; 830, \$87.50; 840, \$88.50; 850, \$89.50; 860, \$90.50; 870, \$91.50; 880, \$92.50; 890, \$93.50; 900, \$94.50; 910, \$95.50; 920, \$96.50; 930, \$97.50; 940, \$98.50; 950, \$99.50; 960, \$100.50; 970, \$101.50; 980, \$102.50; 990, \$103.50; 1000, \$104.50; 1010, \$105.50; 1020, \$106.50; 1030, \$107.50; 1040, \$108.50; 1050, \$109.50; 1060, \$110.50; 1070, \$111.50; 1080, \$112.50; 1090, \$113.50; 1100, \$114.50; 1110, \$115.50; 1120, \$116.50; 1130, \$117.50; 1140, \$118.50; 1150, \$119.50; 1160, \$120.50; 1170, \$121.50; 1180, \$122.50; 1190, \$123.50; 1200, \$124.50; 1210, \$125.50; 1220, \$126.50; 1230, \$127.50; 1240, \$128.50; 1250, \$129.50; 1260, \$130.50; 1270, \$131.50; 1280, \$132.50; 1290, \$133.50; 1300, \$134.50; 1310, \$135.50; 1320, \$136.50; 1330, \$137.50; 1340, \$138.50; 1350, \$139.50; 1360, \$140.50; 1370, \$141.50; 1380, \$142.50; 1390, \$143.50; 1400, \$144.50; 1410, \$145.50; 1420, \$146.50; 1430, \$147.50; 1440, \$148.50; 1450, \$149.50; 1460, \$150.50; 1470, \$151.50; 1480, \$152.50; 1490, \$153.50; 1500, \$154.50; 1510, \$155.50; 1520, \$156.50; 1530, \$157.50; 1540, \$158.50; 1550, \$159.50; 1560, \$160.50; 1570, \$161.50; 1580, \$162.50; 1590, \$163.50; 1600, \$164.50; 1610, \$165.50; 1620, \$166.50; 1630, \$167.50; 1640, \$168.50; 1650, \$169.50; 1660, \$170.50; 1670, \$171.50; 1680, \$172.50; 1690, \$173.50; 1700, \$174.50; 1710, \$175.50; 1720, \$176.50; 1730, \$177.50; 1740, \$178.50; 1750, \$179.50; 1760, \$180.50; 1770, \$181.50; 1780, \$182.50; 1790, \$183.50; 1800, \$184.50; 1810, \$185.50; 1820, \$186.50; 1830, \$187.50; 1840, \$188.50; 1850, \$189.50; 1860, \$190.50; 1870, \$191.50; 1880, \$192.50; 1890, \$193.50; 1900, \$194.50; 1910, \$195.50; 1920, \$196.50; 1930, \$197.50; 1940, \$198.50; 1950, \$199.50; 1960, \$200.50; 1970, \$201.50; 1980, \$202.50; 1990, \$203.50; 2

D. & H. Scovill.....27½%
Am. Fork & Hoe Co. (Scovill Pat-
tern).....60%

Handled—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Cronk's Weeding, No. 1, \$2.00; No. 2, \$2.50
Star Double Bit.....\$3.20
Ft. Madison Cotton Hoe.....70¢&10¢
Ft. Madison Crescent Cultivator Hoe,
½ doz.....70¢&10¢
Ft. Madison Mattock Hoe.....
Regular Weight.....½ doz. 40¢&5¢
Junior Size.....½ doz. \$4.00
Ft. Madison Sprouting Hoe, ½ doz.....
60¢&10¢
Ft. Madison Dixie Tobacco Hoe.....
75¢&10¢
Kretzinger's Cut Easy.....70¢&10¢
Warren Hoe.....45¢&10¢
W. & C. Ivanhoe.....75¢&2¢
B. E. 6 in. Cultivator Hoe.....\$3.40
B. E. 6 in. Cultivator Hoe.....\$3.50
Acme Weeding.....½ doz. net, \$4.35
W. & C. L'ning Shuffler Hoe, ½ doz. \$5.25

Hoisting Apparatus—
See Machines, Hoisting.**Holders— Bit—**

Angular, ½ doz. \$24.00.....45¢&10¢
Door—
Bardley's, Iron, 10%; Brass and
Bronze.....25¢
Empire.....50¢
Pullman.....30¢
Richards Mfg. Co.: No. 117, Ever-
ready, 40%; Nos. 118, 119, Sure
Grip.....50¢
Superior.....35%

File and Tool—

Nicholson File Holders and File
Handles.....35¢&40%

Fruit Jar—

Triumph Fruit Jar Holder, ½ gross,
\$10.80; ½ doz.....\$1.25

Trace and Rein—

Fernald Double Trace Holder, ½ doz.
pairs.....\$1.25
Dash Rein Holder, ½ doz. pairs, \$1.25

Hones—Razor—

Pike Mfg. Co., Belgian and Swat,
50%; German.....35%

Hooks—Cast Iron—

Bird Cage, Reading.....40¢
Clothes Line, Reading List.....40¢
Coat and Hat, Reading.....45¢&20¢
Coat and Hat, Wrightsville.....60¢&5¢
Harness, Reading List.....40%

Wire—

Belt.....80%
Wire C. & H. Hooks.....75¢@-
Bradley Metal Clasp Wire, Coat and
Hat, 70¢&10¢; Ceiling.....70¢&10¢
Columbian Hd. Co., Gem.....70¢&5¢
Parker Wire Goods Co., King.....70¢&10¢
Wire Goods Co.: Chief, 70%; Crown,
75%; Car, 65%; V. Brace, 75%;
Car Harness, 50¢&10¢.

Wrought Iron—

Box, 6 in., per doz., \$1.00; 8 in.,
\$1.25; 10 in., \$2.50.
Cotton.....½ doz. \$1.05@1.25
Wrought Staples, Hooks, &c.—
See Wrought Goods

Miscellaneous—

Hooks, Bench, See Staps, Bench.
Bush, Light, doz., \$6.20; Medium,
\$6.75; Heavy, \$7.65
Grass, best, all sizes, per doz. \$3.00
Grass, common grades, all sizes,
per doz.....\$1.50
Whiffletree.....lb. 5¢@1¢
Hooks and Eyes:
Brass.....60¢@60¢&10¢
Malleable Iron.....70¢@70¢&10¢
Covert Mfg. Co. Gate and Scuttle
Hooks.....40¢
Ft. Madison Cut-Easy, ½ doz. \$3.25 net

Turner & Stanton Co. Cup and
Shoulder.....80¢&10¢
Bench Hooks—See Bench Stops.
Corm Hooks—See Knives, Corm.

Horse Nails—

See Nails, Horse.

Horseshoes—

See Shoes, Horse.

Hose, Rubber—

Garden Hose, ¾-in.:
Competition.....ft. 5¢@6¢
3-ply Guaranteed.....ft. 8¢@9¢
4-ply Guaranteed.....ft. 10¢@11¢
Cotton Garden, ¾-in., coupled:
Low Grade.....ft. 8¢@9¢
Fair Quality.....ft. 10¢@11¢

Irons— Sad—

From ½ to 10.....lb. 3¢@3½¢
B. B. Sad Irons.....lb. 3½¢@3½¢
Mrs. Potts', cents per set:
No. 50 55 60 65
Jap'd Tops.....85 80 93 91
Tin'd Tops.....88 85 98 95
New England Pressing.....lb. 3¢@4¢

Bar and Corner—

Richards Mfg. Co., Bar, 60¢&10¢;
Corner.....60%

Pinking—

Pinking Irons.....doz. 60¢

Irons, Soldering

See Copiers.

Jacks, Wagon—

Covert Mfg. Co.:
Auto Screw.....30¢&2¢; Steel, 45¢
Lockport.....50%

Lane's Steel.....30¢&5¢
Richards' Tiger Steel, No. 138.....50¢&10¢
Smith & Hemenway Co.'s.....25%

Ladder—

Richards Mfg. Co., Ladder Jacks.....50%

Kettles—

Brass, Spun, Plain.....20¢@25¢
Enameled and Cast Iron—See Ware,
Hollow.

Knives—

Butcher, Kitchen, &c.—
Foster Bros' Butcher, &c.....30%
Wilkinson Shear & Cutlery Co.....60%

Corn—

Columbian Cutlery Co., Wilcut
Brand Knives and Hooks.....60%
Wilmington Acme, ½ doz., \$2.65;
Dent, \$2.75; Adj. Serrated, \$2.20;
Serrated, \$2.10; Yankee No. 1, \$1.80;
Yankee No. 2, \$1.15.

Drawing—

Standard List.....75¢@75¢&10¢
C. E. Jennings & Co., Nos. 45, 46,
25¢&7½¢
Jennings & Griffin, Nos. 41, 42,
60¢&7½¢
Swan's.....66¢&70¢
Watrous.....16¢
L. & J. White.....20¢&25%

Hay and Straw—

Serrated Edge, per doz. \$5.50@5.75
Iwan's Sickle Edge.....½ doz. \$9.50
Iwan's Serrated.....½ doz. \$10.00

Miscellaneous—

Farriers'.....doz. \$3.00@3.25
Westenholm's.....½ doz. \$3.00@3.25

Knobs—

Base, 2½-in., Birch, or Maple,
Rubber Tip.....gro. \$1.25@1.40
Carriage, Jap., all sizes.....
gro. 40¢@45¢

Door, Mineral.....doz. 65¢@70¢
Door, Por. Jap'd.....doz. 70¢@75¢
Door, Por. Nickel.....doz. \$2.05@2.15
Bardley's Wood Door, Shutters, &c. 15%

Lacing, Leather—

See Belting, Leather.

Ladders, Store, &c.—

Allith Mfg. Co., Reliable.....50%
Lane's Store.....25%
Myers' Noiseless Store Ladders.....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 109.....50%

Ladies, Melting—

L. & G. Mfg. Co. (low list).....20%
P. S. & W.....40¢&10¢
Reading.....60%

Lanterns—Tubular—

Regular, No. 0.....doz. \$4.35@4.50
Side Lift, No. 0.....doz. \$4.60@4.75
Hinge Globe, No. 0.....doz. \$4.60@4.75
Other Styles.....40¢@40¢&10%

Bull's Eye Police—

3-inch.....\$4.25@4.50

Latches—Thumb—

Roggin's Latches, with screw.....doz. 35¢@40¢

Door—

Allith Mfg. Co., Reliable and Alleg-
ator, 50%; Reliable Cold Storage, 50%
Cromk & Carrier Mfg. Co., No. 101,
½ doz. \$2.30
Richards' Bull Dog, Heavy, No. 125,
50¢&5¢
Richards' Trump, No. 127.....\$1.50

Leaders, Cattle—

Small.....doz. 50¢; large, 60¢
Covert Mfg. Co.:
Cotton, 45%; Hemp, 45%; Jute, 35%;
Sisal, 20%.

Leathers, Pump—

See Pumps.

Lifters, Transom—

R. & E.....10%

Lines—

Wire Clothes, Nos. 18 19 20
100 feet.....\$2.50 2.25 2.00
75 feet.....\$2.10 1.80 1.65

Barnum Cordage Works:
Solid Braided Chalk, Nos. 0 to 3, 40%
Solid Braided Masons'.....30%
Silver Lake Braided Chalk, No. 0,
\$4.00; No. 1, \$4.50; No. 2, \$7.00; No. 3,
\$7.50; No. 4, \$8.00; No. 5, \$8.50;
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3½, \$1.50; No. 4,
\$2.50; No. 4½, \$2.50; Colors, No. 3½,
\$1.75; No. 4, \$2.25; No. 4½, \$2.75;
Linen, No. 3½, \$2.50; No. 4, \$3.50;
No. 4½, \$4.50.....20%
Tent and Awning Lines: No. 5,
White Cotton, \$7.50; Drab Cotton,
\$8.50.....20%
Clothes Lines, White Cotton, 50 ft.,
\$2.75; 60 ft., \$3.25; 70 ft., \$3.75; 75
ft., \$4.00; 80 ft., \$4.25; 90 ft., \$4.75;
100 ft., \$5.25.....20%
Turner & Stanton Co.:
Solid Braided Chalk, Masons' and
Awning Lines.....20%
Clothes Lines, White Cotton.....20%
Shade Cord, Cotton or Linen.....20%

Locks—Cabinet—

Cabinet Locks.....33½%

Door Locks, Latches, &c.—

NOTE.—Net prices are very often made
on these goods.
Reading Hardware Co.....40%
R. & E. Mfg. Co.....10%

Padlocks—

R. & E. Mfg. Co. Wrought Steel and
Brass.....75¢&10¢

Sash, &c.—

Ives' Patent:
Bronze and Brass, 55¢&5¢; Crescent,
60¢; Iron, 60¢; Window Ventil-
ating, 40¢&20¢; Robinson Pat. Ven-
tilating Sash Lock, 35%.

Pullman Patent Ventilating Lock.....35%
Reading Sash Locks.....40%

Machines—Boring—

Com. Up't, without Augers.....
\$2.00@2.25

Com. Ang'l'r, without Augers.....
\$2.25@2.50

Swan's Improved.....40¢&10¢
Jennings', Nos. 1 and 4.....25¢&7½¢
Snell's, Upright, \$2.65; Angular, \$2.90

Corking—

Reinsinger Invinible Hand Power.....
½ doz. \$18.00

Fence—

Williams' Fence Machines.....each. \$5.50

Hoisting—

Moore's Anti-Friction Chain Hoist.....30%
Moore's Hand Hoist, with Lock
Brake.....20%
Moore's Cyclon, High Speed Chain
Hoist.....25%

Ice Cutting—

Chandler's.....12½%

Washing

Boss Washing Machine Co.: Per doz.
Boss No. 1.....\$51.00
Boss Rotary.....\$57.00
Champion Rotary Banner No. 1.....\$57.00
Standard Champion No. 1.....\$50.00
Standard Perfection.....\$27.00
Cincinnati Square Western.....\$33.00
Uneda American, Round.....\$33.60

Mallets—

Hickory.....45¢@50¢
Lignumvita.....45¢@50¢
Tinnors' Hickory and Apple-
wood.....doz. 45¢@50¢

Mangers, Stable—

Swett Iron Works.....50%

Mats, Door—

Elastic Steel (W. G. Co.), new list.....50%
Keystone Wire Matting Co.:
Keystone.....50%
Ideal.....50%

Mattocks—

See Picks and Mattocks.

Milk Cans—See Cans, Milk.**Mills, Coffee, &c.—**

Enterprise Mfg. Co.....20¢@25¢
National list Jan. 1, 1902.....30%
Parker's Columbia and Victoria.....35%
Parker's Box and Side.....50¢&10¢
Swift, Lane Bros. Co.....30%

Motors, Water—

Divine's Red Devil.....30%
Lippincott's.....30%

Mowers, Lawn—

NOTE.—Net prices are generally quoted
Cheapest.....all sizes, \$1.35@2.00
Cheap.....all sizes, \$2.00@2.50
Better Grade.....all sizes, \$2.50@4.50
12 14 16 18-in.

High Grade.....\$4.50 4.75 5.00 5.25
Continental.....60%
Great American.....70%
Great American Ball B'g, new list.....70%
Quaker City.....70%
Pennsylvania.....60%
Pennsylvania, Jr., Ball Bearing.....50¢&10¢&5¢

Pennsylvania Golf.....50%
Pennsylvania Horse.....35¢&5¢
Pennsylvania Pony.....40¢&5¢

Grass State:
Style A, Low Wheel.....70%
Style B, Low Wheel.....70%
Style C, High Wheel, spec. list.....70%&10¢
Style D, High Wheel, spec. list.....70%

Philadelphia:
Style M, S. O. K. T.....70¢&10¢&5¢
Style A, Steel.....60¢&10¢&5¢
Style B, High Wheel.....70¢&10¢&5¢
Drexel and Gold Coin, special list.....40%
Horse.....40¢&5¢
Pony.....40¢&5¢
36-in. Horse.....30¢&10¢
Eagle Horse.....30¢&5¢
I. X. L. Horse.....50%

Nails—

Wire Nails and Brads, Miscel-
laneous.....87½¢@87½¢&10¢
Cut and Wire. See Trade Report.
Hungarian, Finishing, Upholster-
ers' &c. See Tacks.

Horse—

No. 6 7 8 9 10
Anchor.....23 21 20 19 18.....40¢&5¢
Coleman.....13 12 11 11.....net
New Haven.....23 21 20 19 18.....40¢&5¢
Livingston.....19 18 17 16 16.....10%
Western.....½ lb. 8½¢
Jobbers' Special Brands.....
per lb. 9¢@10¢

Picture—

Brass H'd 45 .55 .60 .70 .gro
Por. Head... 1.10 1.10 1.10 .gro

Nippers—

See Pliers and Nippers.

Nuts—

Cold Punched: Off list.
Square, Blank or Tapped.....4.80¢
Hexagon, Blank or Tapped.....5.10¢
Square, B'K, C. T. & R.....5.10¢
Hexagon, B'K, C. T. & R.....5.70¢
Hot Pressed:
Square, Blank.....5.30¢
Hexagon, Blank.....5.70¢
Square, Tapped.....5.20¢
Hexagon, Tapped.....5.60¢

Oakum—

Rest.....lb. 6½¢
U. S. Navy.....lb. 6¢
Navy.....lb. 5¢
Plumbers' Spun Oakum.....3¢@
In carload lots ¼¢ lb. if, f.o.b.
New York.

Oil Tanks—See Tanks, Oil.**Oilers—**

Steel, Copper Plated.....75%

Chase or Paragon:
Brass and Copper.....50¢&10¢
Zinc.....65¢&10¢

Malleable, Hammers' Improved, Nos.
11, 12 and 13, 20%; Old Pattern, Nos.
1, 2, 3, 50%.

American Tube & Stamping Co.:
Spring Bottom Cans.....70¢&10¢
Railroad Oilers, &c.....60¢&60¢&10¢

Openers—Can—Per doz.

Sprague, Iron Handle.....50¢@55¢
Sprague, Wood Handle.....35¢@40¢
Sardine Scissors.....\$1.75@3.00
Yankee Can and Bottle Opener,
½ doz., net, \$0.75; Little Gem,
½ doz., net.....\$0.65

Egg—

Hartigan Nickel Plate, ½ doz., \$2.00;
Silver Plate, \$4.00.

Packing—

Asbestos Packing, Wick and
Rope.....20¢@25¢

Rubber—

(Fair quality goods.)

Sheet, C. I.....11¢@12¢
Sheet, C. O. S.....11¢@12¢
Sheet, C. B. S.....12¢@13¢
Sheet, Pure Gum.....40¢@45¢
Sheet, Red.....40¢@50¢
Jenkins' '96, ½ lb. 80¢.....25%

Miscellaneous—

American Packing.....lb. 7¢@10¢
Cotton Packing.....lb. 16¢@25¢
Italian Packing.....lb. 9¢@12½¢
Jute.....40¢@4½¢
Russia Packing.....lb. 8¢@11¢

Pails, Water, Well, &c.—

See Buckets.

Pans—Dripping—

Standard List.....65¢@7½¢@70%
Edwards, Royal Blue.....65¢@7½%

Fry—

Common Lipped:
Nos. 1 2 3 4 5
Per doz. \$0.75 0.80 0.90 1.10 1.30

Refrigerator, Galva.—

Inch.....12 14 16 18
Per doz. \$1.75 2.25 2.80 3.15

Paper—Building Paper

Asbestos.....lb.
Roll Board or Building Felt,
6 to 30 lb., per 100 sq. ft. 3½¢@5¢
Roll Board or Building Felt,
3-32 and ¼ in., 45 to 60 lb.,
per 100 sq. ft.....6¢
Mill Board, Sheet, 40 x 40 in.,
1-32 to ½ in.....3¢@5¢

Roan Sized Sheathing—500 sq. ft.

Light weight, 25 lbs. to roll.....40¢@50¢
Medium weight, 30 lbs. to roll.....50¢@55¢
Heavy weight, 40 lbs. to roll.....65¢@70¢

Black Water Proof Sheathing,

500 sq. ft., 1 ply, 65¢; 2 ply,
85¢; 3 ply, \$1.10; 4 ply, \$1.25.
Deafening Felt, 9, 6 and ½ sq.
ft. to lb. ton.....\$50.00
Red Rope Roofing, 250 sq. ft.
per roll.....\$1.75

Tarred Paper—

1 ply (roll 400 sq. ft.), ton.....
\$31.00@33.00
2 ply, roll 108 sq. ft.....68¢
3 ply, roll 108 sq. ft.....98¢
Slater's Felt (roll 500 sq. ft.).....75¢

Sand and Emery—

Flint Paper and Cloth 50¢@10¢@-
Garnet Paper and Cloth.....25¢
Emery Paper and Cloth.....50¢@60¢

Parers—Apple—

Goodell Co.:
Family Bay State.....½ doz. \$15.00
Improved Bay State.....½ doz. \$36.00
New Lightning.....½ doz. \$7.00
Turn Table '98.....½ doz. \$6.00
White Mountain.....½ doz. \$5.00
Bonanza Improved.....each \$7.50
Dandy.....each \$10.00
Eureka Improved.....

Slaw Cutters—See Cutters

Snaps. Harness—

Snaps, Harness—
German 40@40 & 10 %
 Covert Mfg. Co.:
 Derby, 25%; Yankee, 30&2%; Yankee
 Roller, 30&2%.
 High Grade, 40%; Trojan.....40%
 Jockey 25

Scythe 55%

Sales, Timmer, & St...

Salma Tinsley et al.

Ships, Tinnors—See *Shcars*

Spoons and Forks

Silver Plated—

Good Quality.....50¢10¢160¢5%

Cheap 60¢ (60¢ + 10%)

1847 Rogers Bros., 40&10%: Rogers

& Hamilton.....	50&10%
Rogers & Hrs. William Rogers'	

Rogers & Bro., William Rogers	
Eagle Brand.....	50&10%

Anchor, Rogers Brand.....	60%
Wm. Rogers & Son.....	60&10%

Miscellaneous

German Silver 60@60.45%

Tinned Iron

Tc98 per gr0.50@55¢

Tables per gro. \$0.90 @ \$1.00

English Door

Springs= Door=

Bardsley, Spring and Check.....	40%
Chicago (Coil).....	40&10

1207

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